UNITED STATES ARMY

AUGUST 1976

AVIATION DIGEST

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AUGUST 1976 VOLUME 22 NUMBER 8

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U. S. ARMY AVIATION CENTER
A major activity of the
U. S. Army Training and Doctrine Command

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A major activity of the
Inspector General and Auditor General
of the U. S. Army

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ABOUT THE COVER

Featured in this issue is the 11th Aviation Group (Combat) located in Europe. It consists of a headquarters company, six aviation companies and four aviation detachments. On the cover is the group crest. It was drawn by Mr. Joe M. Folsom

The mission of the *U.S. ARMY AVIATION DIGEST* is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

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This publication has been approved by The Adjutant General, Headquarters, Department of the Army, 23 December 1975, in accordance with AR 310-1.

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National Guard and Army Reserve units under pinpoint distribution also should submit DA Form 12-5. Other National Guard units should submit requests through their state adjutant general.

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COMMANDER'S LETTER

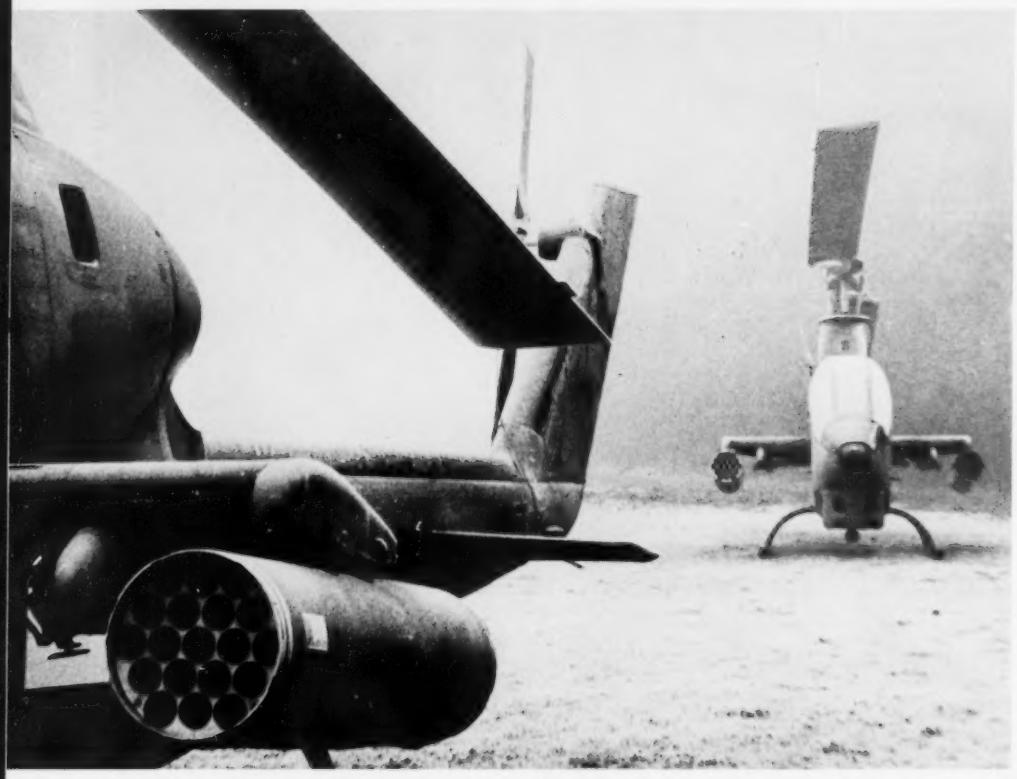
THE SOLDIERS OF the 11th Aviation Group (Combat) have accomplished much toward increasing combat readiness during the past training year. All training has been oriented toward ensuring that group units can operate successfully in the European mid-intensity, high threat environment. The following summarizes the group's major goals and achievements:

- Attack, assault, medium/heavy lift and surveillance operations in Europe have become highly visible, sophisticated and recognized as an integral part of the combined arms concept.
- Night low level training is in the action stage and confidence and proficiency build daily.
- An advanced terrain flight area has been developed where Aviators are sharpening their NOE, contour and low level flight proficiency.
- On a daily basis, OV-1D Mohawks provide valuable intelligence information around-the-clock and in all types of weather with SLAR, IR and photo systems.
- Tactical instrument training is producing Aviators who can accomplish the mission under adverse weather in the forward area.
- The ability to support and receive support from our NATO allies—interoperability—is becoming a reality.
- The group has flown 35,000 hours during the past 18 months without an accident.

The European environment presents special problems for aircrews and the doctrine for tactical helicopter operations will continue to be refined. We look forward to being a more decisive force on the battlefield with the Cobra/TOW, AAH, ASH, UTTAS and the improved Chinook. We are continuing to improvise and improve those skills which will ensure that Army aviation makes a significant contribution in any future conflict.

Francis J. Toner

FRANCIS J. TONER
COL, TC
Commanding



In Reforger 74 the AH-1 HueyCobra, shown here in the staging area while under fog and ice conditions, proved to be an effective tank-killer

11th Aviation Group Aviation Training In USAREUR

Captain Eric R. Kunz

Assistant S-3
11th Aviation Group
USAREUR

ARMY AVIATION IN Europe prior to 1974 was practically at a standstill as USAREUR took backseat to the Vietnam war effort. Little interest and money were invested in the conventional role of Army aviation in Europe.

Now things are changing; aviation in Europe is on the move!

Two basic facts have precipitated the change. The first is the realization that Army aviation will have a vital role in USAREUR's overall mission in NATO. Second, Army aviation is receiving positive command attention. General George S. Blanchard, commander in chief, USAREUR, has stated that Army air resources, particularly the AH-1Q Cobra/TOW, will make the difference in confrontation with the WARSAW Pact Forces.

The change from the old days of aviation stagnancy in USAREUR to the dynamic, important role directed by General Blanchard is not based solely upon technological systems advances such as the Cobra/TOW. The exciting part of the change, particularly for the Aviator, is the emphasis on realistic training.

The 11th Aviation Group (Combat) is at the center of aviation policy and doctrine development in USAREUR. The group is a diverse aviation unit directly subordinate to headquarters USAREUR, and responds directly to the Deputy Chief of Staff for Operations.

The command consists of a headquarters company, six operational aviation companies and four aviation detachments located throughout the Federal Republic of Germany. The versatile 71st Aviation Company provides the group with the multiple capabilities of an assault helicopter company. Medium and heavy lift capabilities are provided by the 108th Aviation Company (CH-47 Chinook) and the 295th Aviation Company (CH-54 Tahre or Sky Crane) respectively. Upon acceptance of the AH-1Q Cobra/TOW later this year, the 334th Aviation Company (Attack Helicopter) will be the real sting for the group. The 73rd Military Intelligence Company provides USAREUR an aerial reconnaissance capability with the OV-1D Mohawk. VIP support of USAREUR headquarters in Heidelberg is provided by the 207th Aviation Company whose aircraft inventory consists of the C-12 Huron, UH-1 Huey and OH-58 Kiowa. By nature of its command relationship with USAREUR and the diverse units and aircraft within its TOE, the 11th Aviation Group provides a unique structure from which to influence the progress being made by Army aviation in Europe.

Each of the group's units specialize in defined missions which rarely overlap. There is, however, one common denominator which improves the capability of each unit to accomplish its mission—combined arms training. Within the 11th Group the emphasis on all flight training is to seek missions which can be flown in support of the ground commander, preferably on an FTX, ARTEP or CPX. The benefits exchanged are twofold: realistic training and an exchange of information between the air and ground personnel, resulting in an education for both.

The highlight of aviation combined arms training in USAREUR, particularly for the 11th Aviation Group, is conducted in conjunction with three major training exercises: Reforger; Alpine Friendship; and Flintlock.

Reforger is the most realistic use of aviation assets in that it is an exercise of USAREUR's capability to conduct conventional operations. The 11th Aviation Group objectives during Reforger are to support USAREUR in exercising its operational plan for the Reforger mission; provide intensive field training employing all TOE capabilities of the maximum number of aviation units; and to support the validation of any USAREUR aviation test organizations under study.

The objective to support USAREUR implementation of its operational plan for Reforger 75 was successfully accomplished by combining the group's units with other USAREUR aviation assets into two provisional aviation battalions. Each supported one side of Reforger's opposing forces. This organization provided the respective exercise directors a versatile, well balanced composite of aviation elements with which to influence the action. The most effectively used units were, naturally, those employing attack helicopters. Once again the AH-1 HueyCobra proved

Continued on page 18

The 75th Aviation Company provides the group with assault helicopter capabilities

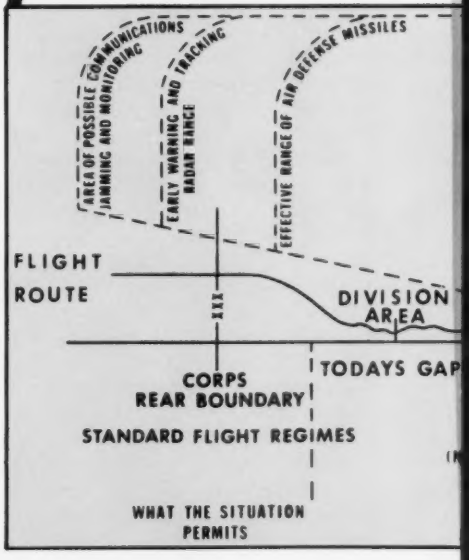
Refer to Glossary on page 23

TACTICAL INSTRUMENT FLIGHT — WILL YOU BE READY?

THE GAP THAT MUST BE BRIDGED

CW2 Alvin T. Kyle Jr.

CH-47C Instructor Pilot
180th Aviation Company
11th Aviation Group
USAREUR



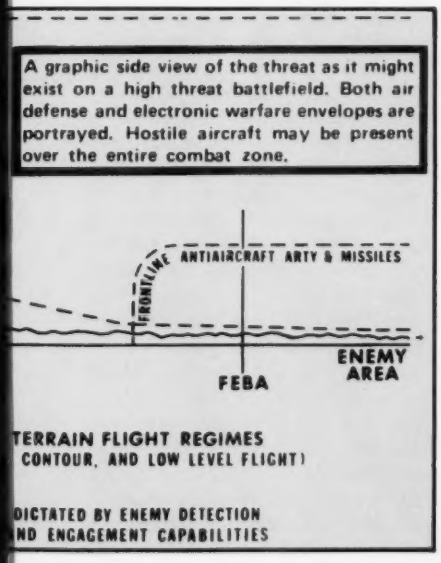
Refer to Glossary on page 23

A SERIOUS GAP currently exists in Army aviation tactics because vital aviation support often is unavailable due to weather restrictions.

Consider the situation that could arise if this gap is not bridged. The ground commander in a VMC area desperately needs the aviation assets in an IMC area. He has immediate medevac missions, resupply is becoming critical and the threat of enemy armor moving unchecked into his sector is increasing. His repeated request for these assets is met with the statement that all his aviation support is grounded due to the weather. Any number of situations such as this can be visualized with this gap unplugged. Can this situation be accepted on a modern battlefield? Of course not, and the solution to the problem is *tactical instrument flight.*

Tactical instrument flight is defined by FM 1-5 as flight under instrument meteorological conditions in an area that is directly affected by the threat (figure 1). It will be used as a normal means to complete assigned missions when ceiling or visibility conditions preclude visual flight or normally regulated IMC flight.

Figure 1
Tactical Instrument Flight


A graphic side view of the threat as it might exist on a high threat battlefield. Both air defense and electronic warfare envelopes are portrayed. Hostile aircraft may be present over the entire combat zone.
FRONTLINE
ANTIAIRCRAFT ARTY & MISSILES
ENEMY AREA
FEBA
TERRAIN FLIGHT REGIMES
CONTOUR, AND LOW LEVEL FLIGHT)
DICTATED BY ENEMY DETECTION
ND ENGAGEMENT CAPABILITIES

Tactical instrument flight will allow a commander to utilize assets in an IMC area that were previously grounded due to weather. It also will enable many missions to be continued during periods of severely reduced visibility. In areas of the world such as Europe, where the weather reduces visibility on a year-round basis and a high threat precludes normally regulated IMC flight, tactical instrument flight surely will increase aircraft utilization and mission accomplishment. It will allow an Aviator to transition from conventional IMC flight in a rear area to tactical instrument flight as far forward as a division area. At this point a tactical instrument approach could be initiated to proceed to VMC conditions, and the Aviator could continue to the FEBA using low level, contour and finally NOE flight as the threat dictates. Further, there are several situations where missions could continue in the IMC area with the use of tactical instrument flight. Scout and attack helicopters could remain onstation with weather deteriorating where previously they had to be recalled. Utility helicopters could perform vital medevac and troop movements. Transport helicopters could operate completely IMC as far forward as division areas using tactical instrument flight and still stay below the present day threat. This capability will fill the gap that exists in present day tactics.

With this in mind, what we as Aviators are saying is that we will engage in tactical instrument flight as low as needed, provided we have the systems to meet the requirement. Even with today's equipment tactical instrument flight is entirely within the flight and training envelope of many of the Army's present day aircraft and avionics.

The 11th Combat Aviation Group, located in the Federal Republic of Germany, is now in the process of exploring this training envelope. The 180th Aviation Company (ASH) has been tasked to prove the concept of tactical instrument flight in Europe. Using the CH-47C Chinook helicopter as the flight platform, routine tactical instrument training is being flown on a daily basis.

The most important and demanding part of tactical instrument flying is the tactical instrument approach. The "tactical instrument letdown" or corridor approach (figure 2) has been the main emphasis of the training program. This approach is being performed at Giebelstadt, an inactive airfield north of Schwaebisch Hall (SWH), using the Wurzburg VOR and the Kitzingen NDB.

The 040 degree radial off Schwaebisch Hall NDB is flown outbound to intercept the 170 degree radial off Wurzburg. Flying inbound to WUR on a heading of 350 degrees (170 degree radial), the first letdown intersection is fixed. Minimum descent altitudes between intersections are fixed as follows:

Between intersections I and II—400 feet AGL

Between intersections II and III—300 feet AGL

Between intersections III and Giebelstadt—200 feet AGL

Having completed the tactical instrument approach, the training aircraft can either continue on a low level course which is another phase of 11th Aviation Group training or execute a missed approach to Schwaebisch Hall for continued tactical instrument training.

As more NAVAID equipment, the AN/TRN-30 nondirectional beacon or even the AN/TRN-30(XE-1) portable beacon, becomes available, the "tactical circling letdown" or spiraling

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The HAWK Performs In Europe

The 73rd Military Intelligence Company (Aerial Surveillance) has a mission completion rate of

99 percent

WANT A REAL challenge? Want to fly with the best? Want to do something really worthwhile? The challenge is flying the product improved OV-1D Mohawk in the European environment.

The mission is worthwhile because it's real—not just realistic. It is operational. The task: Provide timely intelligence to headquarters USAREUR on a daily basis.

Interesting and rewarding are other terms that Aviators use to describe a most complex aircraft and its mission in a potentially hostile area. Through a complicated process the data collected by the aircrews is distilled and disseminated to interested commands.

The new Mohawk is equipped with the latest state-of-the-art navigation, sensor and ECM. This equipment permits the well trained crew to fly in virtually any weather—day or night and safely bring back the required information—or "data link" it to the ground commander. So well has the "Hawk" performed that the 11th Aviation Group's 73rd Military Intelligence Company (Aerial Surveillance) has a mission completion rate of 99 percent—the highest of any intelligence gathering platform in the European Command.

Here's how it's done: Direct tasking comes from USAREUR headquarters and the company begins integrated preparation to fly the SLAR mission of the denied area. Aircrews (pilot and technical observer) are briefed by the operations and intelligence duty personnel; primary and backup aircraft are made ready by maintenance, avionics and surveillance platoon personnel; and coordinated planning is begun by the aircrew and operations flight coordinator.

An IFR flight plan is filed and verified with ATC while initial approval to enter the European ADIZ is coordinated with the U. S. Air Force and NATO GCI controllers. Discrete frequencies and callsigns are allocated while the pilot and TO doublecheck inertial guidance navigation checkpoints and range clearances. Survival gear is issued

Refer to Glossary on page 23

Captain Michael F. Blacker

Operations Officer
73rd Military Intelligence Company
11th Aviation Group
USAREUR

and checked. As the crew departs for the aircraft final clearance to launch is obtained along with discrete transponder codes that the "friendlies" will recognize.

While the pilot preflights the aircraft and programs the ASN-86 inertial navigation system's computer, the TO rechecks the sensor equipment and tests the secure communications equipment so that he can call "inflights" to the respective ground commander who is also vitally interested in this flight. [The TO has the capability to report targets of interest or opportunity to commanders of quick reaction forces opposite the denied area.]

Start and runup is "routine" and launch takes place within moments of the ETD—or else recoordination must be effected. Coded messages are sent to various locations announcing the takeoff.

Now beings the most challenging and demanding parts of the flights—absolute/precise navigation on the part of the Aviator in a very sensitive area while handling the UHF and VHF radios—and 18,000 pounds of aircraft.

Targets of interest are reported on FM radio by the TO as he constantly monitors the sensor equipment. "Strangers" are reported by the GCI site as the pilot checks the ECM gear. Seems like the other side is aware of our plan as the TO uses antijamming techniques on his equipment. The RHAW comes alive as the other side "practices" on the Mohawk "enemy target."

As the pilot brings the OV-1D off mission track and thanks the folks at GCI, he's already prepared for the ILS or GCA back home—Europe's weather just never seems to cooperate.

After touchdown, imagery interpretation personnel quickly download the product and rapidly and accurately send their mission report to the interested commands. The aircrew debriefs with other intelligence personnel while final messages are sent out by operations. Sounds like a big operation and it is—but it's a routine, common mission of a "Hawk" aircrew in USAREUR.

Of course this is not the only mission performed by the Mohawk in Europe. Support of major combined arms training exercises such as Reforger, Flintlock and Alpine Friendship are high on the priority list as well as SLAR, infrared and photographic missions for the U. S. and German corps, division and brigades.

This is but a small part of the revitalized Army aviation effort in USAREUR—mission safely accomplished.

Night Terrain Flight Training In USAREUR

Major George R. Miller

Commander
71st Aviation Company
(Assault Helicopter)
USAREUR

THE FIRST MAN to enter the briefing room is "Cisco" Rettaguez. Close on his heels is his constant companion, "Pancho" Villa. It is 1545 hours. They have 15 minutes before the 1600 hour briefing on tonight's terrain flight training.

In 5 minutes the room is ready. They have done this for several weeks now, and the briefing has become routine. More Aviators arrive: "Wild Bill" Old walks in with "Sky" King and Sky's younger brother "Butch." Right behind them is Wild Bill's uncle, "Cooler" Old. "Bubbly" Bergundy and "The Munchkin" are followed by three unit instructor pilots—"Easy Rider" Soremack, "Pappy" Napkin and "Tinker" Tomson. Next comes "Harry" Rustycan and "Chuck" Baggoner.

Finally at 1555 hours, in strolls "Gorgeous" Bully, and that perennial candidate for the unit's "Dubious Award of the Month," the aviation safety officer himself, "Skeeter" Ford. Every unit in USAREUR has a group of colorful, professional and competent Aviators such as these.

Cisco is ready. At precisely 1600 hours he begins. "Gentlemen, tonight we are going to fly our aviation group's night terrain flying course. The crew assignments and aircraft are listed on the chalkboard to your front as are the training missions each aircrew will be flying. Note that Butch and Gorgeous in aircraft 243 will fly multiple aircraft configuration with Tinker and The Munchkin in aircraft 130, and with Easy Rider and Sky King in aircraft 638. The rest of the crews will fly single ship as indicated. We will depart our airfield with 10-minute separations between training elements, as indicated here on the chalkboard."

"Wild Bill and Uncle Cooler will fly the S&C mission in aircraft 619. They will take off 10 minutes before the first mission aircraft and will station

Refer to Glossary
on page 23

themselves in orbit over the town of Tauberbischofsheim, in the center of the course. As usual they will have a forced entry kit aboard as well as a qualified medic. Aircrews will report all checkpoints on the course as well as arrivals and departures from LZs. Here on the chalkboard are the primary UHF and the secondary VHF to be used with the S&C aircraft for those reports. Aircrews will monitor these frequencies at all times so we can provide rapid response in case of emergency." Skeeter smiles.

Cisco is rudely interrupted when the door to the briefing room flies open and in stomps that terror of the "5,000 feet and above" set, the local instrument flight examiner, "Stormin' Norman." "What are you guys doing?," he demands.

"We're conducting a briefing for night terrain flying," answers Cisco.

Stormin' storms, "Terrain flying! At night? You clowns are crazy! The only place to fly is a mile up, and preferably in the clouds. You people are going to crash into something flying that close to the ground."

Skeeter frowns. Wild Bill turns and says, "Well Stormin', when things start popping here in Europe, and people are aiming antiaircraft missiles up your tailpipe, then I suppose you're going to outrun them in your mile-high, 100-knot helicopter? Or maybe you plan to hide from them in the clouds?"

"Well. . . ," says Stormin', a bit less belligerently.

"Sit down, Stormin'," barks Cisco. "You've got a lot to learn about terrain flying, both day and night, so that you and other Army Aviators can survive to accomplish your missions on the mid-to-high intensity battlefield of tomorrow."

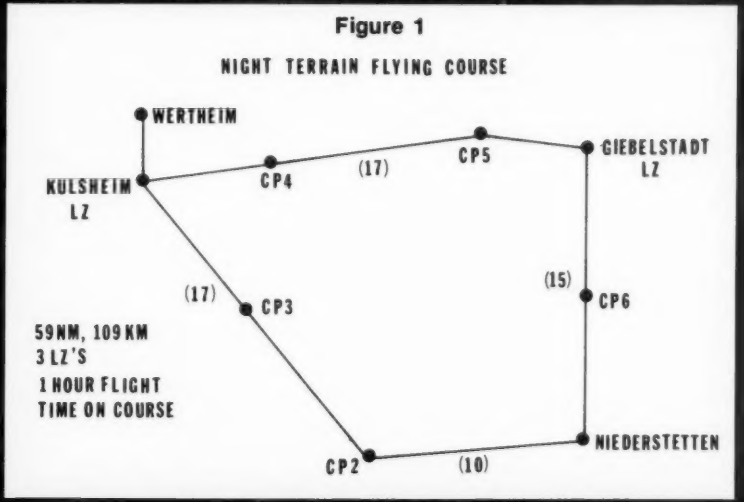
Cisco continues his briefing. "Now, let's look at this sketch of the course [figure 1]. Tonight you will fly the course counterclockwise. From our base here at Wertheim you will enter the course at Kulsheim. All checkpoints are terrain or man-made, semipermanent features which are easily recognized at night from altitudes of 500 feet AGL or below. Nautical mile distances for each side of this 4-sided course are shown in parenthesis. Total distance is 59 NM. Pathfinders from 11th Aviation Group headquarters will set up and operate Niederstetten and Giebelstadt LZs with a tactical "T" and glide slope in each LZ. There will be no other lighting in the LZs.

"Soldiers from our unit's communications section will have a PRC-77 in the Kulsheim LZ. They will be there for your use in practicing FM homing techniques. FM frequencies and callsigns for these three locations are listed on the chalkboard. Each aircrew should plan on a minimum of three landings and takeoffs at Niederstetten and at Giebelstadt. The multiple aircraft crews should plan all landings and takeoffs in formation altering position so each crew gets practice flying lead.

"Landing lights and searchlights will not be used during this training, and aircraft navigational lights will be placed in the "STEADY-DIM" position. Only the trail aircraft in multiple ship operations will have the anticollision light in the "ON" position. Single aircraft will leave the anticollision light "ON" for safety." Skeeter smiles. "It will take you approximately 1 hour to fly this course, including work in and around the LZs, depending on the phase of training with which you are involved. The more advanced crews may take as long as an hour and a half because of reduced airspeeds at lower altitudes.

"The weather for tonight is typical for the European winter—1,000 feet overcast and 2 miles visibility in haze." Skeeter frowns. "Ground fog is expected to begin forming at midnight, but as our training will terminate at 2200 hours that should not be a factor. There will be no precipitation and the freezing level is at 2,000 feet. Pancho will give a more detailed weather briefing shortly." Skeeter's frown becomes a bit

Figure 1



less severe than it was before.

"Flight readiness inspections on all aircraft will be conducted immediately following this briefing, during full daylight." Skeeter smiles. "Are there any questions?," asks Cisco.

When all questions are answered and Pancho completes his detailed weather briefing, the aircrews leave the briefing room to prepare for their night training mission. Stormin' Norman approaches Cisco. "I guess Wild Bill is right," he says. "How about telling me about this 'terrain flying at night' business."

"I'll be glad to," says Cisco. "I'll review the whole thing for you.

"In August of 1975 the 11th Aviation Group tasked this company to develop a night training program for all units of the group. We knew from the start that this training would have to be done with existing equipment and that we would not have such things as radar altimeters, night vision devices and special lighting.

"Second, because of the human nature, fear of the unknown and the danger, it was necessary to build the confidence of our aircrews in their capability to operate at night, close to the Earth's surface. We decided to develop a phased program for the acclamation of aircrews to the demands of this new, low visibility environment.

"Third, this phasing would be progressive so that proficiency of aircrews would rise in direct proportion to their confidence in their abilities.

"Fourth, we planned to make maximum use of the extended hours of darkness during the European winter.

"And finally, throughout the program, training in night *tactical* operations would be emphasized.

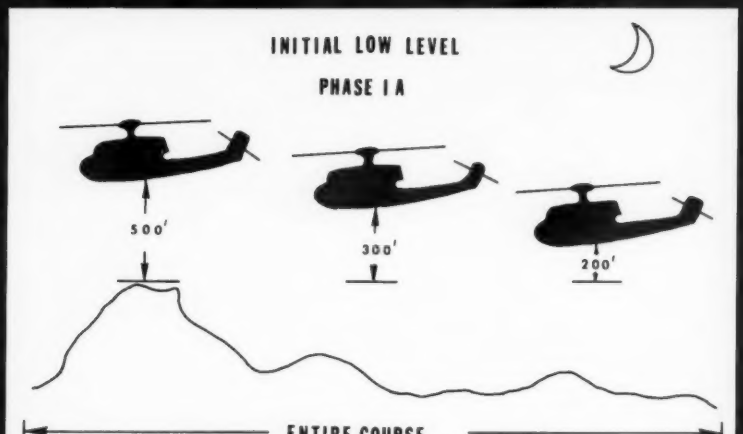


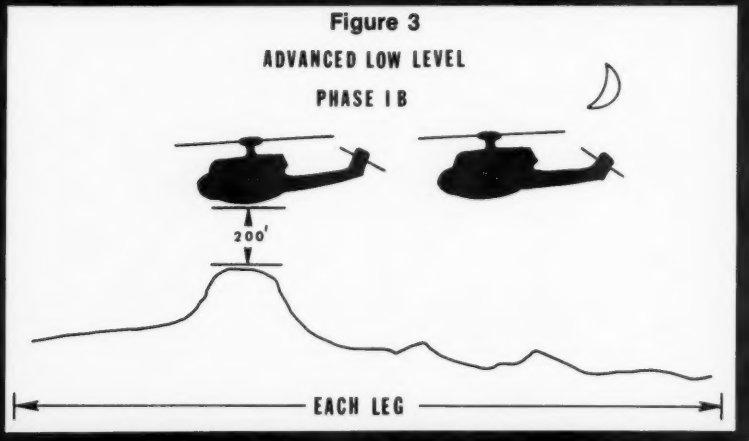
Figure 2

"Training began last summer during a field training exercise with combat troops of our German Partnership unit. The company conducted night low level flight, formation flying and assault insertions and extractions. From that exercise until the present the program has been progressing steadily throughout the 11th Aviation Group. All rotary winged aircraft of the group have been participating—the OH-58, UH-1, AH-1, CH-47 and CH-54.

"Now let me show you the breakdown of our training. In Phase I we concentrate on low level training. In the initial stage [figure 2] an aviator starts at an altitude of 500 feet above the highest point of terrain or obstacle on the *entire course*, and in subsequent training flights works his way to proficiency at an altitude of 200 feet above the highest point on the *entire course*.

"In the advanced stage of training in this phase, the aviator flies low level at an altitude of 200 feet above the highest point of terrain or obstacle on *each leg* of the course [figure 3]. You can see from the course sketch [figure 1] that eight different altitudes will be flown during this stage of

Figure 3



training, to correspond with the eight legs of the course, from Kulsheim around to Kulsheim. An aviator flies stage with both single and multiple aircraft configurations.

"All through this low level training we concentrate on techniques of navigation pilotage at night, time-distance-heading precision, Pathfinder operations, glide slope operations, landings to a tactical "T," minimum lighting of landing zones and aircraft, and night tactical formation flight and control.

"It is imperative in Phase I that an Aviator pay close attention to aircraft altitude, attitude, heading and airspeed control.

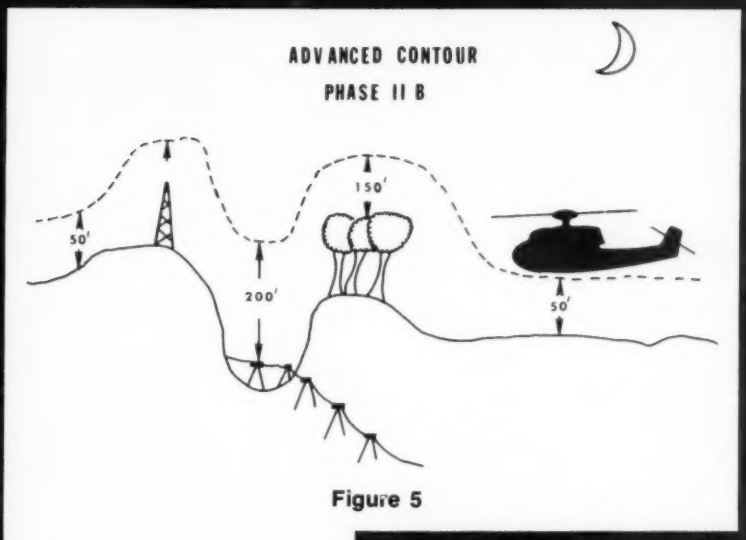


Figure 5

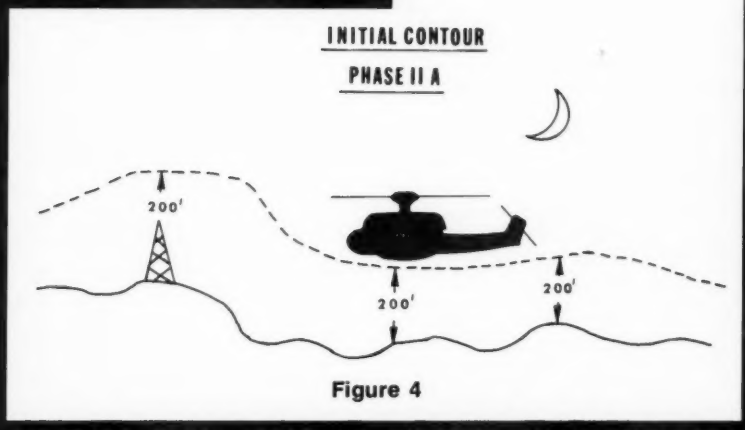


Figure 4

He must make constant reference to his instruments in order to fly his mission precisely as planned."

"Hey, Cisco, I *like* that!" says Stormin'.

"I figured you would," replies Cisco, with a hint of sarcasm in his voice.

"But in this next Phase, night contour flying, things get more interesting. This is where we really get close to the Earth's surface. The Aviator starts this training by flying the course in the daytime, to mark on his 1:50,000 tactical map those terrain features and manmade obstacles which will pose a hazard to night contour flight. Armed with this knowledge and flying at airspeeds in which the Aviator is proficient in terrain flight, the Aviator flies the course maintaining a contour altitude of approximately 200 feet above terrain and obstacles [figure 4]. Again, this stage is flown with both single and multiple aircraft configurations until proficiency is attained.

"Finally, in advanced contour flight the aviator tailors his altitude above terrain and obstacles depending on the nature of the hazard [figure 5]. He may be no more than 50 feet above flat and level terrain where there are no manmade obstacles, or he may climb to 150 or 200 feet above power lines, towers, trees or urban areas."

"Cisco," says Stormin', "that sounds awfully dangerous to me, flying around wires, trees and towers at night."

"There's no doubt that an element of risk exists," answers Cisco. "We emphasize to our Aviators that the keys to safe and successful flight at these altitudes are:

- Thorough route reconnaissance and hazard identification;
- Reduced airspeeds to assist in pinpoint navigation;
- If in doubt about hazards location, immediately climb to safe 200 feet contour altitudes already identified in the initial stage of contour training.

The latter point is one of the great, confidence building features of this phased, progressive, training program."

"Great!" exclaims Stormin'. "When do I start?"

"I thought you'd never ask," says Cisco.

The 11th Pathfinder Platoon (Airborne)

2LT Michael J. Whitehead Commander

THE PATHFINDER's motto, "First In—Last Out," gives some insight into the valuable mission they perform in Europe. The Pathfinders of the 11th Aviation Group (Combat), who by the way are all on jump status, provide the vital link to ensure the safe and orderly flow of tactical aircraft. From operating a tactical night low level course to rigging a bridge or UH-1 Huey for sling loading, the "black hats" are truly professionals in every sense of the word.

The primary Pathfinder mission is to provide tactical air traffic control to Army aviation, to include enroute navigational assistance and terminal guidance. An additional mission of the Pathfinder is to assist in the rigging, preparation and positioning of loads and sling loads. Pathfinders are capable of infiltrating an objective area by air, land or sea to establish landing zones at or beyond the FEBA. Once established, they can provide information on landing sites; landing directions; traffic patterns; coordinates; time and maximum ordinate of artillery fires. And they can provide taxi, hover, parking and takeoff instructions to aircraft commanders. Pathfinders are able to perform any of their assigned missions with a minimum of preparation.

Equipment organic to the platoon includes tactical; manportable visual approach path indicators; nondirectional beacons; lights; light guns and radios. All the equipment used is capable of being carried in by the Pathfinder team regardless of the method of insertion. The platoon has slings and rigging material for any type of sling load, to include an aerial recovery kit for downed aircraft. All this equipment is put to good use during major combined arms training exercises such as Reforger in which the Pathfinder plays a significant role.

Each week the men of the Pathfinder platoon set up and supervise a night low level training course in southern Germany and provide air traffic control to the advance terrain flight area. Also high on the priority list is the integration of Pathfinder support into a tactical instrument training program.

The training and education programs of the 11th Pathfinder Platoon are a continuing process. Practice infiltration by parachute, aircraft and on foot is a regular occurrence as is instruction to U. S. and NATO commanders on the employment of the Pathfinder. Platoon members give briefings throughout the European Command stressing the importance of coordination, organization and aviation safety.

A typical mission for the Pathfinders is establishing a night LZ for combat assaults. The mission is passed from the S-3, 11th Aviation Group to the platoon commander, who designates a team and team leader. The team leader coordinates with the ground and aviation unit commanders and then issues his order to his team.

A helicopter picks up the team, camouflaged and heavily laden with equipment, and inserts it clandestinely some distance from the objective. The team moves to the LZ and prepares it for the arrival of the aircraft; i.e., reconning for obstacles and setting up a lighted "T." When the aircraft calls at the CCP the Pathfinder assists the Aviator in finding the LZ and advises him of conditions on and around the LZ. As the Infantrymen offload the aircraft, the Pathfinders assemble their equipment and board the departing helicopters, mission accomplished.

Aviation crews should be aware of the significant contribution to the field of aviation safety made by the Pathfinders. In the final analysis the major reason for the existence of the Pathfinders is to make it safer and easier for the Aviator to accomplish his mission.

The role of the Pathfinder is evolving along with the increased importance of aviation on the modern battlefield. Remember this: If your mission is near the forward edge of the battlefield—or beyond—a Pathfinder will be there to assist mission accomplishment and safety.

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A Bavarian Fable

(Four Key Lessons)

Captain Joe D. Coyner Jr.
Maintenance Officer
334th Aviation Company (Attack Helicopter)

THERE IS ONLY one thing in this world greater than a helicopter pilot—and that is a group of helicopter pilots. I guess I've spent the majority of my adult life in the association of these guys, and the bad times have been few and far between. Right now I am with the 334th Aviation Company (Atk Hel) in Germany and I'll tell you right off, they are about as good as I've ever seen.

Anyway—ole B.L. (Bad Luck) Young and I were telling war stories the other night and we finally rolled around to our most recent adventure which took place in southern Bavaria. It seems that Uncle Sam has this Super Bowl of unconventional war games called Alpine Friendship and all of the super players were invited. Our guys provided the attack, reconnaissance and C&C portion of the aviation task.

You are probably wondering by now just how Bad Luck got his name. Well this guy considers it a good day if he doesn't break or lose anything valued more than $300.00. If he weren't such a good pilot, he would have been dead before this tale evolved. He also happens to be nuts but then he would have to be to tolerate his luck. Back to the story though. As I said we took part in this operation and B.L. and I thought the story might be worthwhile reading for fellow Aviators.

We headed down toward Munich late in April with 3 days to "scope" out the AO before the kickoff. The first thing I saw was enough wires to stretch from here to Pluto. I almost told B.L. to go home but you don't eliminate your stars unless it is absolutely necessary. I knew right off we would have to really be "up" for this one to avoid some nasty injuries.

Whoever picked southern Bavaria for the AO did a heck of a job. The place is beautiful and features about every type of terrain short of desert. The Alps were snow covered and the flatland was green and in full bloom. After a Hanau winter this setting was paradise.

We were camped at a West German airfield just to the south of Munich called Neubiberg. They obviously knew we were coming because the facilities were well prepared and adequate. After a night in Munich where B.L., J.B. Krumrine, Dick Evans and I sent the local McDonalds looking for more beef, we established our operations section and commo with our higher headquarters, the 11th Aviation Group (Combat). Calling them turned out to be the end of our "scope" plans because they immediately committed us to the game.

About this time our commander, S.K. Samage, showed up with Ace Rawls in the most gaudy HueyCobra you ever saw. This thing is mostly bright orange with some other colors thrown in, and you can see it coming 30 miles away. Everyone swears the Army wants it that way because it is a trainer, but I think somebody grabbed it enroute from the Bell plant and did it a trick or two. Anyway S.K. and Ace got there only to find out they had missed the kickoff. (Now no one knows for sure what S.K. stands for, but it is rumored that he is really Sky King. All I know is that we had to put a phone booth on the flight line and S.K. has been seen entering in fatigues and coming out in one-piece Nomex with genuine aviation sunglasses.) Ace is our SIP and they say he can do anything in a Cobra except count to 10 on his fingers and thumbs. But that is another story.

The games were about 3 days old when S.K. decided we would never finish the first quarter at the pace things were going. It seemed that the ground commanders were so enthused with our performance that they wanted our support, in total, 10 and 12 hours a day. Now with the old economy kicking up and things

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like helicopter and human body maintenance needed, something had to give. After a skull session between S.K. and an LTC or two, we got the pace set more realistically. B.L. says I should label this lesson no. 1 and he *is* an IP so here goes:

> *Aviation units must coordinate with the ground commanders to ensure the latter not only understand aviation's capabilities but also its limitations. You just cannot assume that ground commanders are experts in your field. Proper planning is impossible without this coordination.*

As I said before there were tons of wires in the AO. They were everywhere including the sides of the Alps. The wind also was not to be denied and it was at its best in the mountains. Old Rex Swartz, our safety officer, wanted to protest the game on account of these conditions. He immediately decided our pregame safety briefing had been inadequate. He said he would need until next year to make up a class covering it all. When these conditions are coupled with low level or NOE tactical flights, the probability of an accident has to increase. We managed to get through the entire operation without an incident but after the postgame debriefing several close calls came to light. Our guys were so keyed up that sometimes their limitations and the limitations of the aircraft got stretched a bit. B. L. is watching wild wild west on the tube but I think this point merits my making a lesson no. 2 on my own.

> *Aviators must guard against becoming so mission oriented that they ignore the limits of their own abilities and limits of the aircraft. They also must evaluate the flight environment and its effect on aircraft performance. Getting the job done is important but cockpit professionalism is a key part of an Aviator's job.*

B. L. is waving a wrench so I guess he wants me to mention our maintenance. Those guys were something else. The company flew more than 1,000 hours in 3 weeks and this presented a real test for Chipper and the gang. We had to stage from a field site on Friday through Sunday each week. This added an additional problem. It seems with noise abatement procedures being what they are, we couldn't get into or out of our German airfield from Friday evening until Monday morning. As a result we roughed it at Chiemsee Lake Lodge on the weekends. We parked the aircraft in a field nearby and this was Chipper's maintenance facility. The boy did good. I don't remember turning down one mission because of aircraft availability.

One morning the officials decided to start the day's game at some unbelievable hour like 0300. They wanted some first light VR in order to use the element of surprise. Anyway S. K., Ace, Killer Jim Allen and yours truly stole through the night in an attempt to locate the parking sites of our assigned aircraft. After a preflight by flashlight we got underway. We were supposed to recon the slopes of the Alps for a distance of about 20 kilometers. Let me tell you I would rather face the Miami Dolphins alone than to do a live VR in the dark. Everywhere you turned it seemed there were wires, ski lift cables, etc.

We concluded the mission was less than effective because the altitude we had to fly for minimum safety in the darkness prevented adequate results on the VR due to the darkness. In addition the minimum safe altitude put us in the enemy kill zone. Our normal offense is NOE tactics and this experience rang our chimes when we considered the impact on our employment. You guessed it—lesson no. 3.

> *Until night vision devices and improved navigation systems are available, true NOE tactics during periods of total darkness or extremely limited visibility are inadvisable. A modified low level flight is possible, but flight personnel must be well trained and the mission must be thoroughly evaluated to determine the probable effectiveness of this type of flight.*

Well the games were finally over and everyone was ready to head back home to wives, girlfriends, kids, etc. As luck would have it the weather took a turn toward miserable. We were at our "field site" and decided to send B. L. and CPT John Fuller up for a weather check. They radioed back acceptable ceilings and visibility so the flight took off. Now I use the word flight as in geese because we had a bunch of helicopters. The weather was good enough to complete the flight, but it was marginal in places. Thinking back on it, I get an uneasy feeling somewhere in my stomach. Have you ever considered inadvertent IFR procedures for a flight of 10 or so? B. L. and I figure the procedure would be 18 of the 20 pilots saying, "wish I was tail end Charlie." This leads to lesson no. 4.

> *No mission is over until the last piece of equipment and the last man is home and all recovery operations completed. An absolutely perfect performance during the actual operation can be ruined completely by an accident during recovery. Don't ever let "Get-home-itis" override sensible planning and procedures.*

Well I think we won the war and I know we gained a wealth of experience that will make us even better next year. To be completely serious for a minute, the 334th did fly more than 1,000 tactical flight hours in 3 weeks over very demanding terrain without an accident or incident. To me this points out the professionalism of Army Aviators, but the lessons also point out that there is always room for improvement. The key is to realize this, learn something from every flight experience and always try to do it better the next time.

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Army Aviation Birthday

Sergeant Dennis A. Dussault
U. S. Army Aircraft Development Test Activity
Fort Rucker

WITH THE PASSING of the 6th of June, Army aviation gained another year of experience. In celebration of this 34th anniversary, the U.S. Army Aviation Center scheduled a full day of activities on 8 June to commemorate Army aviation's past and reflect on its future. The activities began at Ft. Rucker's Cairns Army Airfield where some 5,000 to 6,000 persons gathered to observe a static display and flying demonstrations. MG William J. Maddox Jr. [now retired], MG Spurgeon Neel and BG Robert Holloman joined other guests in examining 17 assembled aircraft which represented the history and mission of Army aviation.

Even with the wide interest in the displays, aviation and nonaviation personnel alike were present primarily for the "action" presentations. These were prefaced with a welcoming speech by General Maddox, the Aviation Center commander who set the scene for the day with a recounting of Army aviation's role and of aviation training from its inception as an observation element to its posture today as an integral part of a combined arms team. General Maddox pointed out how in Vietnam, Army aviation proved it could perform the five ground combat roles of reconnaissance, logistic support, command & control, firepower and maneuver. To fulfill these roles modern aviation training doctrine is aimed at maintaining survivability on a high threat battlefield.

The battlefield techniques used in a combined arms tactical exercise proved to be one of the high points of the day. Observation aircraft pinpointed targets for Air Force F-4 initial reaction to "enemy" aggression. The OV-1 Mohawk's ability to view and record the enemy later attracted a crowd which viewed photographs the Mohawk took of the bleacher area in the course of the "battle." Attack teams of OH-58 Kiowa and AH-1Q HueyCobra helicopters illustrated the intervisibility of aircraft in the field, accenting NOE/terrain flying techniques. Cobra mounted TOW; Huey inserted ground TOWs; and tank teams simulated the destruction of mock "enemy" tanks and the repulsion of the attacking force. As the battle concluded the Army's Silver Eagles precision flying team performed maneuvers similar to those in which Army Aviators must be proficient to survive in the field.

Spectators at Cairns AAF for static display and flying demonstrations. Soldiers at left displayed various weapons, tactical maps and the flight routes of participating aircraft for the audience

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COL Joseph Rutkowski, Director, Department of Undergraduate Flight Training, was chairman of the activities at Cairns AAF. A project committee, headed by MAJ Clark Sands, coordinated the static display and the combined arms tactical exercise. Enemy and friendly forces were provided by the 33rd Tactical Fighter Wing (Eglin AFB, FL); the 131st Armor Alabama National Guard; the 159th Military Intelligence Georgia National Guard; B Company, 1/29th Infantry (Ft. Benning, GA); the Rotary Wing Division's Attack Branch of the Aviation Center's Department of Graduate Flight Training; and the Advanced Division of the Department of Undergrduate Flight Training.

Another highlight of the day was induction of the following seven men into the Army Aviation Hall of Fame: Mr. William T. Piper; COL Delbert L. Bristol (Ret); COL John W. Oswalt (Ret); COL Jack L. Marinelli (Ret); MG Spurgeon Neel; MG William J. Maddox Jr. (Ret); and MG James C. Smith. Their contributions to Army aviation range from the introduction of light planes into combat zones in World War II, to the testing and evaluation of aircraft and related equipment, to the pioneering of aeromedical evacuation of battlefield casualties, and to the development of tactics and doctrine for the use of aviation in support of ground troops.

Later in the afternoon Mr. Edwin A. Link presented an early Link Trainer, which has played an important part in aviation training, to the U. S. Army Aviation Museum. The day concluded with Army aviation getting its birthday cake at the Bicentennial Aviation Ball.

The message of Army aviation's 34th birthday celebration/memorial/motivator is clear: The proven versatility of the helicopter in accomplishment of the battlefield mission in conjunction with proven mobility and staying power of helicopter firepower has assured Army aviation of a place in the future, a place in the "One Army Concept." With the coming of the TOW missile, the AAH and the UTTAS, Army aviation is entering a new era where helicopters are deployed in mass, in fair weather and foul, day or night. Army Aviators have met the challenges of the past and are prepared now to meet the challenges of the future.

AH-1 Cobra attack helicopter during a part of the NOE and low level flight demonstration makes a high speed pass in front of the onlookers

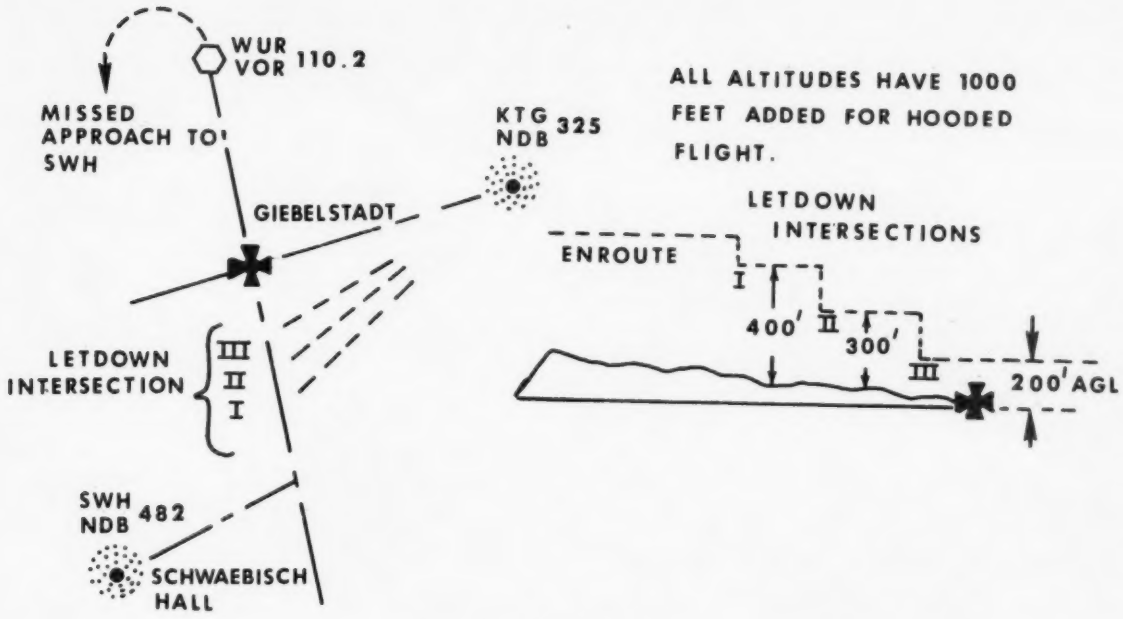

Figure 2
Tactical Instrument Letdown

THE GAP—

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approach will be incorporated more into the training program (figure 3). The Dinkelsbuhl VOR to the east of Schwaebisch Hall serves as our letdown beacon for this approach.

Upon reaching the beacon and obtaining beacon passage the training aircraft executes the following maneuvers:

Decelerates to 60 kts

Initiates a 15 to 20 degree turn

Starts a descent of 300 fpm

When minimum descent height of 200 feet AGL is reached, a missed approach to SWH is executed by climbing back to enroute altitude over the beacon and then proceeding to the SWH NDB.

It is foreseen in the not too distant future, through added equipment, that approaches requiring no minimums can be executed. The 11th Aviation Group will be ready when systems such as the AN/TRQ-33 microwave landing system become available. We are training to fill the gap in tactical operations that now exists in parts of the world where weather plays a major role in mission accomplishment. This gap is steadily being narrowed through increased training. Tactical approaches will bring the window of mission accomplishment down to 200 feet AGL. We look to the future—to systems and training that will take that window all the way to the ground. Only then will we have an all-weather fighting force unhampered by the whims of nature.

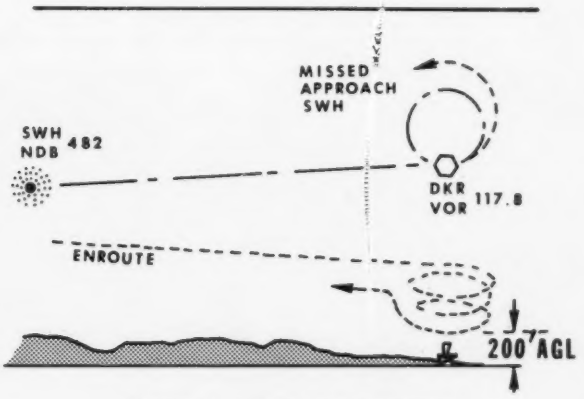

Figure 3 Tactical Circling Letdown

11th Aviation Group Aviation Training In USAREUR

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that it was extremely effective as a tank-killer. For example, the 334th Aviation Company, participating with the Blue Forces combined arms team in three tactical phases of delay, defense and offense, amassed a total of 250 destroyed enemy vehicles. This umpire-verified total represents the equivalent of nine battalions of enemy vehicles neutralized and equates to a favorable kill ratio of 17 to 1 for the Cobra/TOW.

The 334th Aviation Company's achievement is even more impressive when one realizes that the company deployed to the field with an aircraft availability rate of 87 percent and returned 2 weeks and 700-plus flying hours later with an 89 percent availability rate.

While recent Reforger exercises have been extremely beneficial for the attack and assault helicopter companies, they also have pointed out the need for exercise participants to plan for the effective employment of medium and heavy lift helicopters. CH-47s and CH-54s have proven through realistic unit training that they can operate very effectively in a mid-intensity, high threat environment performing vital resupply and relocation missions.

The group was highly successful in accomplishing its second goal during Reforger in that intensive tactical field training was provided to all participants. Adverse weather conditions, low ceilings and restricted visibility prevailed throughout the exercise. Unrestricted NOE flight was authorized for the entire maneuver area to include NOE flight over previously non-reconnoitered terrain. Underwire operations were authorized. Hot refueling was safely and successfully accomplished using the new lightweight FARE system.

The 73rd MI Company exercised all aspects of its capabilities providing SLAR, IR, and photo support under tactical conditions. SLAR data links were provided to the ground commanders giving them real, timely intelligence. Of the 24 SLAR missions flown this year, 22 were successfully data-linked to the ground commander. Support of this year's Reforger made it possible for the OV-1D Mohawk to demonstrate its triple threat capability of data-linking, down-loading and inflighting SLAR.

Exercises Flintlock and Alpine Friendship are unconventional, freeplay exercises wherein the 11th Aviation Group supports both conventional and unconventional forces. Both exercises provide a different

Medium and heavy lift capabilities are provided by the 108th Aviation Company (CH-47 Chinook) and the 295th Aviation Company (CH-54 Tahre or Sky Crane) respectively

The 207th Aviation Company has C-12 Hurons (above), UH-1 Hueys and OH-58 Kiowas

training environment than that of Reforger.

Alpine Friendship is held in the spring of each year and is the major training exercise for the 10th Special Forces Group at Bad Toelz, Germany. Paradrops, day and night infiltrations and exfiltrations, slingloads and aerial reconnaissance in the foothills of the Alps combine to give each of the participating units and individual Aviators a meaningful and exciting opportunity to exercise their aviation expertise.

The 11th Group provides maximum support to the exercise for several reasons. Primarily, the varied mission requirements during Alpine Friendship provide an excellent opportunity for each unit to train for its distinctive mission. Unit commanders are given the opportunity to manage their resources while working directly with other exercise participants. Because Alpine Friendship is the first major field exercise each year, the group units can plan their pilot and crewmember winter training cycles to peak during the exercise.

Using OV-1D Mohawks the 73rd Military Intelligence Company provides USAREUR an aerial reconnaissance capability

Although Exercise Flintlock is not as large as Alpine Friendship in the level of aviation support which is provided, it is just as beneficial a training vehicle for all the group's assets. The scenario and therefore the type missions for the exercise are very similar to Alpine Friendship. The majority of the flying during Flintlock is done at night, thereby providing extensive training for all the group's helicopter units and its Pathfinder platoon.

Army aviation in USAREUR and the 11th Aviation Group is entering a new progressive era. The introduction of the Cobra/TOW and the demonstrated effectiveness it has shown in numerous tests and field exercises has helped to balance the odds against the WARSAW Pact countries. More importantly, however, the shift of aviation training, particularly in the major training exercises, has had a significant effect on the proficiency of aviation units and their morale.

The AH-1Q Cobra TOW will give the 334th Aviation Company (Attack Helicopter) a real sting

The United States Army Europe is an effective fighting force capable of facing the WARSAW Pact threat. The 11th Group has firmly established itself as an integral part of that force. The introduction of the Cobra/TOW has done much to balance the opposing forces' threat and therefore fix a definite place for Army aviation in the combined arms team. Improved training has solidified that position for all aviation units. Major training exercises such as Reforger and Alpine Friendship provide a realistic platform for aviation and ground commanders to operate together and learn each others strengths and weaknesses. Through these exercises and others like them, the 11th Aviation Group and all of aviation in Europe is turning the concept of combined arms training into the combined arms threat.

The air assaults during LAMSON 719 were met with intense opposition from a highly sophisticated NVA antiaircraft system

The Army Aviation Story Part XII: The Late 1960s

Major David H. Price

THE AIRMOBILE concept was tried and tested in battles large and small throughout the Vietnam years. No major battle was fought without helicopters providing the transport, reconnaissance, communications and firepower that only rotary wing aircraft could contribute.

During the Tet Offensive of 1968 the armed UH-1 Huey and the few AH-1HueyCobras incountry were widely acclaimed as having thwarted the enemy's attempt to seize Saigon's Tan Son Nhut Air Base. The relief of Khe Sanh was accomplished by the 1st Cavalry Division (Airmobile) later that year. The overall aggressive and determined efforts of the ARVN and its allies in 1968 seriously stunned the NVA offensive and set back the enemy's timetable for victory substantially. Without the helicopter the Allied victory might not have been so thorough; it might not have been won at all.

The war changed after 1968. Pressures on the homefront in the United States to get out of the war reached a new high after the Tet Offensive. The policy of Vietnamization, or turning the war back over to the ARVN, was quietly adopted by the United States. The enemy had been hurt badly in 1968, however—so badly that he could not launch a major campaign during the following 2 years.

In order to assure the safe withdrawal of American forces, President Richard Nixon decided that the enemy's sanctuaries in neighboring Cambodia had to be destroyed. In 1970 U. S. and ARVN airmobile forces, in conjunction with ground thrusts, attacked into Cambodia. The operation was a resounding success. The NVA logistics system in Cambodia was destroyed. Major General Elvy R. Roberts, commanding the 1st Cavalry Division (Airmobile), had these words of praise for his troopers who participated in the Cambodian operation:

> . . . The results are impressive. You killed enough of the enemy to man three NVA regiments; captured or destroyed enough individual and crew served weapons to equip two NVA divisions; and denied the enemy an entire year's supply of rice for all of his maneuver battalions in our AO. You captured more rocket, mortar and recoilless rifle rounds than the enemy fired in all of III Corps during the 12 months preceding our move into Cambodia. And perhaps most important, by working together in an airmobile team, you disrupted the enemy's entire supply system, making chaos of his base areas and killing or driving off his rear service personnel.
>
> Only time will tell how long it will take the NVA to recover, but of this you can be sure—you have set the enemy back sufficiently to permit President Nixon's redeployment plan to proceed with safety while assuring that our Vietnamese Allies maintain their freedom. This is your achievement. This is yet another demonstration that you of the 1st Cavalry Division deserve—and have earned again—the accolade of the First Team. It is my honor to have served alongside you during this crucial and historic period.

Lieutenant General John J. Tolson III summed up the 1st Cavalry's Cambodian operation:

> The 1st Cavalry Division operation in Cambodia far exceeded all expectations and proved to be one of the most successful operations in the history of the First Team. All aspects of ground and air combat were utilized—air cavalry, armor, infantry and mechanized infantry. The U. S. Air Force reconnaissance, tactical air and B-52s performed yeoman duty throughout the campaign there. This team effort, spearheaded by the airmobile flexibility inherent in the 1st Cavalry, carried the war to the enemy and defeated him in his own backyard.

By 1971 U. S. ground troops were well on their way out of the Vietnam conflict. The government of Vietnam decided to interdict the Ho Chi Minh Trail in Laos with a large-scale ground and air operation. Only ARVN troops were to be used. U. S. Soldiers were not to set foot in Laos. A major portion of U. S.

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support, however, was to be in the form of helicopters, both in the transport and air cavalry roles.

The air assaults during LAMSON 719 were met with intense opposition from a highly sophisticated NVA antiaircraft system. Casualties among helicopter crews were much higher than in the usual South Vietnamese environment. Some critics said the Army's airmobile concept had met its Waterloo.

The losses of helicopters and crews during LAMSON 719 were of great concern to the Army. But when measured against the hostile environment and the accomplishments, the losses were not considered excessive. Brigadier General Sidney B. Berry Jr., a key Army commander during the Laos operation made the following assessment:

> . . . Our experience in conducting airmobile operations in support of LAMSON 719 confirms the soundness of the concept and principles of airmobility developed by the U.S. Army. We have, of course, modified and adapted specific tactics and techniques to cope with the operational environment. But airmobility principles and concepts have proven sound and valid.
>
> Living and operating in the ground Soldier's environment, the armed helicopter escorts troop-lift helicopters flying the Soldier to and from his operations, escorts helicopters delivering ammunition, food, water, supplies and mail to the Soldier, and escorts the medical evacuation helicopter rescuing the wounded Soldier from battle. The armed helicopter flies underneath ceilings measured in hundreds of feet to locate targets threatening or attacking the Soldier to deliver timely, responsive, accurate fire within tens of feet of the Soldier's position.
>
> The fighter-bomber has a unique capability to place heavy firepower and a variety of ordnance in close support of the ground Soldier. The fighter-bomber's most distinctive characteristic is its ability to deliver heavy bombs in support of the ground Soldier. The fighter-bomber flies underneath ceilings measured in thousands of feet, to deliver heavy bombs within hundreds of feet of the ground Soldier's position and lighter ordnance even closer.
>
> The armed helicopter and fighter-bomber team works effectively in LAMSON 719. Armed helicopters of the air cavalry reconnoiter objective areas, landing and pickup zones, and their approach and departure routes; acquire and mark targets on which the forward air controller directs air strikes; conduct low level bomb damage assessments; and work with the forward air controller in developing additional targets for air strikes. Armed helicopters and tactical air work together to prepare the objective area, landing and pickup zones and approach and departure routes for safe passage and landing of the troop-lift and heavy-lift helicopters in and out of the landing zone while the forward air controller directs air strikes into adjacent target and danger areas.
>
> The helicopter and its crew have proven remarkably hardy and survivable in the mid-intensity conflict and hostile air defense environment of LAMSON 719. We have lost remarkably few helicopters and crewmembers in view of the heavy small arms,

the antiaircraft, and mortar and artillery fires our aircraft and crews have experienced while conducting extensive airmobile operations on NVA home ground. This is even more remarkable in view of the numerous airmobile operations conducted in support of Vietnamese ground units located in small perimeters, surrounded by NVA units and weapons, and often in heavy contact with the enemy.

To assess and evaluate properly our aircraft and crew losses, one must measure these losses against the campaign plan, mission, total sorties, and number of exposures to enemy fire, and accomplishments. When viewed in this perspective, we have fared better than the most optimistic prophet would have dared predict.

For more than 30 years critics have been claiming the helicopter is vulnerable. The Army believes that its airmobile forces can survive in most intensities of combat and can be effective in dealing with many different operational scenarios.

One of the most revealing experiences of LAMSON 719 was the attack helicopter's frequent encounter with enemy armor. Attack helicopters in the air cavalry role often encountered enemy light tanks while on reconnaissance in Laos. Upon sighting tanks the cavalry gunships would engage them by fire to maintain contact, then normally turn the target over to the Air Force and continue their reconnaissance. If no fighter-bombers were available, the helicopters would attack the enemy tanks with their own weapons. Often the Cobra's ordnance was insufficient to destroy the tank. Had antitank weapons been available to the Cobra in Laos, many tanks would undoubtedly have been destroyed. General Berry was convinced:

> . . . We need now tank-defeating armed helicopters. Had we entered LAMSON 719 with a helicopter armed with an accurate, lethal, relatively long-range antitank weapon, we would have destroyed many more NVA tanks and would have rendered more effective close support to Vietnamese ground forces. As I consider our experience against NVA tanks in LAMSON 719 and ponder what would face us on a European-type battlefield, I am absolutely convinced that the U. S. Army must field immediately an armed helicopter with an effective tank-killing capability. If the AH-1G Cobra mounting the TOW gives us that required capability the soonest, fine. I hold no brief for any particular weapons system, but I do hold the firm conviction that we need now the armed helicopter tank-killer.

In the Cambodian operation the enemy was denied an entire year's supply of rice for all his maneuver battalions in the 1st Cavalry Division (Airmobile) area

During the Tet Offensive of 1968 the armed UH-1 Huey and the few AH-1 HueyCobras were widely acclaimed as having thwarted the enemy's attempt to seize Saigon's Tan Son Nhut Air Base

The Army has acted in consonance with General Berry's urging, and now possesses tested attack helicopters especially equipped to kill tanks. Capable crews have been trained. All that remains is to try them in combat.

The present-day Army is striving not to forget the lessons it learned in Vietnam. Currently the focus is on the high threat environment which the European battlefield would present. The recent Mideast wars have been carefully studied. New aircraft and related equipment is being fielded, tested or is on the drawing boards—hardware that will give the flying Army deadly striking power in all types of weather, day or night, against any and all expected threats. New organizations are being formed to exploit this dynamic doctrine. The 6th Air Cavalry Combat Brigade unfurled its colors at Ft. Hood, TX, in 1975. Interestingly enough the Howze Board recommended a similar unit more than a decade ago. The Army Aviation Story, from balloons to tank-killers, is a story of dedicated Soldiers who cared enough to fly "Above The Best."

> The one inescapable conclusion is that the airmobility concept is irreversible. The thousands of officers who have learned to think and fight and live in three dimensions will never allow themselves to be restricted to two dimensions in the future. Airmobility will change and grow, but it is here to stay . . .
>
> Lieutenant General John J. Tolson III

GLOSSARY

AAH	advanced attack helicopter
ACR	armored cav regiment
ADA	air defense artillery
ADIZ	air defense identification zone
AGL	above ground level
AIM	Airman's Information Manual
AO	area of operations
ARTEP	Army training and evaluation program
ARVN	Army of the Republic of Vietnam
ASH	advanced scout helicopter
ATC	air traffic control
ATFCQA	advanced terrain flight confidence/ qualification area
Atk Hel	attack helicopter
C&C	command and control
CCP	communications checkpoint
CINCUSAREUR	Commander in Chief, United States Army, Europe
CONUS	Continental United States
CP	command post
CPX	command post exercise
DOD	Department of Defense
ECM	electronic countermeasures
ETD	estimated time of departure
FARE	forward area refueling equipment
FARRP	forward area refueling and rearming point
FEBA	forward edge of the battle area
FLIP	flight information publication
FM	frequency modulated
fpm	feet per minute
FTX	field training exercise
GCA	ground controlled approach
GCI	ground controlled interception
IFR	instrument flight rules
ILS	instrument landing system
IMC	instrument meteorological conditions
IP	instructor pilot
IR	infrared
KTG	Kitzingen NDB
kts	knots
LO	liaison officer
LZ	landing zone
medevac	medical evacuation
MI	military intelligence
MTA	major training area
NATO	North Atlantic Treaty Organization
NAVAID	navigational aid
NBC	nuculear, biological, chemical
NDB	nondirectional radio beacon
NM	nautical mile
NOE	nap-of-the-earth
NVA	North Vietnamese Army
RHAW	radar homing and warning set
ROTC	Reserve Officers' Training Corps
RVN	Republic of North Vietnam
S&C	safety and control
SIP	standardization instructor pilot
SLAR	side looking airborne radar
SOP	standing operating procedures
SWH	Schwaebisch Hall NDB
TO	technical observer
TOE	table of organization and equipment
TOW	tube-launched, optically-tracked, wire-guided
UHF	ultra high frequency
USAATCA	U.S. Army Air Traffic Control Activity
USAREUR	U.S. Army, Europe
UTTAS	utility tactical transport aircraft system
VHF	very high frequency
VIP	very important person
VMC	visual meteorological conditions
VOR	VHF omnidirectional range
VR	visual reconnaissance
WUR	Wurzburg VOR

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**Army aviation must conduct train
is to survive and be an effective m**

Major Glenn R. Allen
S-3
11th Aviation Group
USAREUR

THE ANTIARMOR platoon, seven AH-1 HueyCobra and four OH-58 Kiowa helicopters, were using every fold of the terrain to avoid detection. The weather was not unusual for Germany, a half-mile visibility with haze and ceilings around 100 feet.

The platoon was enroute to its FARRP located 30 kilometers to the southwest. Members of the platoon had received a mission briefing, had conducted a detailed map reconnaissance prior to takeoff and were using traveling and bounding overwatch techniques of flight within the boundaries of the corridor they had established. The corridor was wide enough to allow the aircraft to choose the best masking terrain as they advanced, and the boundaries ensured they did not wander off course.

Halfway to the FARRP a powerline, its tips obscured by clouds, blocked the platoon's path. The platoon leader knew from his prior map reconnaissance that the powerline extended across the corridor and had briefed his platoon on the action to be taken. The lead OH-58 advanced to the vicinity of one of the poles, verified his clearance, edged under the wires (guided from the rear by a second scout) and then moved forward to provide security. The second scout edged under the wires and turned to guide the larger AH-1s under.

Having successfully negotiated this obstacle without being detected, the platoon continued NOE to the FARRP. While the AH-1s were being armed, the scouts moved forward to locate firing positions. Now armed the AH-1s moved two at a time to concealed firing positions. They received target descriptions and distances from the scouts, popped up over the berm and expended on the targets.

This exercise is but one example of the training that can be accomplished under very real conditions at the recently established USAREUR ATFCQA adjacent to the Hohenfels MTA. The 11th Aviation Group (Combat), the USAREUR aviation group, was responsible for developing the area in coordination with the USAREUR aviation office. The 334th Aviation Company (Attack) established and reconnoitered the area and coordinated the details with the Hohenfels MTA staff.

The ATFCQA is a 418-square kilometer area which includes terrain and vegetation common to almost every area in Germany Dense forests in parts give way to less dense, rolling terrain in others. Typical German farms and villages dot the area. Powerlines, in abundance in Germany, are present in enough numbers to ensure realism. Aviation units from anywhere in Germany can train under conditions very similar to those in which they must be prepared to conduct combat operations. Training in the area is authorized at clear of clouds and one-half mile visibility, and "hot" refueling and under wire operations are permitted. When a task organized mechanized or armor brigade, or ACR, moves to the MTA, attached or organic aviation elements may use the ATFCQA for the majority of their flight training without interrupting live fire exercises by ground elements in the MTA.

Although the type of aviation training conducted in the

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training under realistic conditions if it ve member of the combined arms team

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ATFCQA depends on the type of aviation unit using it, it is intended to reinforce training conducted throughout the year in local training areas. No courses are established in the area. Units may give their platoons, teams or crews a mission and threat situation and allow them to plan and fly their own courses. Ground maneuver rights are not routinely available in the area but ADA units can be positioned to attempt detection of aircraft flying terrain flight maneuvers. The 11th Aviation Group, V Corps and VII Corps, and some divisions have established NOE courses. But these courses have readily apparent limitations. Aviation units may, however, during their ATFCQA training, develop appropriate confidence/qualification courses to evaluate the effectiveness of their local courses.

Courses also may be established in the ATFCQA requiring crews to react to NBC attacks, enroute mission changes, attacks by high performance aircraft, electronic warfare, and any other situation appropriate to the unit's mission. The area is large enough for assault helicopter units to practice company size operations with aircraft negotiating multiple NOE routes to arrive at the LZ for a company size airmobile operation.

Two important features of the ATFCQA are its proximity to the MTA and that most aviation training is in conjunction with a task organized brigade. At some point in the training cycle the brigade commander allocates MTA ranges for aerial gunnery training. Also, the training exercise described in the opening paragraphs of this article is conducted. Ranges at Hohenfels MTA will accept almost all aerial weapons systems to include the TOW. Aircraft may conduct separate aerial gunnery training or firing may be in conjunction with combined arms live fire problems. Other combined arms training is possible which encourages transitioning from the ATFCQA to the MTA. This may be a short problem such as a maneuver battalion in the defense supported by antiarmor helicopters, or a scenario taking several days and supported by antiarmor, assault and assault support helicopters. In either case the aviation elements use terrain flight techniques through the ATFCQA to arrive at a specific location on the MTA to support the ground maneuver elements.

The 11th Aviation Group is confident that aviation training can be conducted under very real conditions, such as those established for the ATFCQA, and still meet high safety standards. The group has conducted this same type of training during major exercises such as Reforger and Alpine Friendship without mishap.

The ATFCQA allows the training to be conducted at more frequent intervals and the type of aviation training conducted is restricted only by the participating unit's level of proficiency, resources and imagination. Army aviation must conduct training under realistic conditions if it is to survive and be an effective member of the combined arms team. The advanced terrain flight confidence/qualification area is but one more innovation in support of that goal

"INTEROPERABILITY"— The NOW Challenge In Europe

Major Gary F. Ramage

Commander
334th Aviation Company
USAREUR

ONE OF THE MOST stimulating challenges being faced by Army aviation units in USAREUR is that of developing procedures for working effectively with Allied NATO units during combined field exercises. The end objective—*interoperability*, the ability to perform effectively as part of a bi- or multinational combined arms team in the European environment. As aviation assets, particularly antiarmor aviation assets, become increasingly recognized as key elements for the winning of that much emphasized "first battle of the next war," the demands for interoperability will increase.

During 1975 the 334th Aviation Company (Attack Helicopter), 11th Aviation Group (Combat), had unusual opportunities to experience the challenge of interoperability. This pioneer Army aviation unit participated in a series of international field exercises, demonstrations, briefings and forums, representing both USAREUR and the Army in the antiarmor helicopter role. Working with German, French, Canadian and Belgian forces, many problems of interoperability were encountered. All exercises did not go smoothly but the experience gained was invaluable. No textbook, manual or article can replace experience which comes from actually participating in multinational combined arms field training exercises. Through the mutual frustrations experienced during the challenging combined field maneuvers, both U. S. and Allied participants learned important lessons, forged strong professional bonds and shared feelings of camaraderie as fellow Soldiers.

U. S. aviation units whose missions permit should seek every opportunity to work closely with Allied ground and air units and to maintain close coordination during periods when other commitments preclude combining forces for training. Through repeated training opportunities the problems will lessen and the experience will

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become more rewarding. In the meantime for those Aviators and units who have not yet been exposed to the challenge of interoperability, perhaps some lessons learned by one unit based in Germany may prove valuable.

From the 334th Aviation Company's experience during five major field exercises in 1975, ranging geographically from Germany's snowclad Bavarian Alps to the fabled Salisbury Plain of England, three general guidelines emerge as essential to achieve interoperability:

- *Total professionalism on the part of all U. S. Army aviation personnel participating in exercises with allies is a prerequisite for mission accomplishment.*
- *Early, continuous and intensive coordination between Allied and U. S. Army elements must be effected.*
- *U. S. Army aviation units and crews must be prepared to communicate in a language other than their own.*

These three guidelines, if followed, will not guarantee success from an interoperability standpoint. If they are not followed, failure to accomplish the mission *and* failure to operate effectively as part of a U.S.-Allied team is almost certain. An explanation of that contention and amplification of the deceptively simple three guidelines follows.

Total professionalism on the part of all U. S. Army aviation personnel participating in exercises with allies is a prerequisite for mission accomplishment. Almost all NATO Allies have great respect for the aviation expertise gained by the U. S. Army during our RVN experience. These predominantly noncombat veteran forces and their leaders observe carefully every aspect of our employment and support of our aviation assets. Earnestly seeking to learn from us they question or challenge unexpected actions or procedures by U. S. aviation representatives. They rightly expect our crews and leaders to be able to justify our methods, whether it be flying NOE, pulling a maintenance inspection or setting up a field latrine. It is essential that our personnel be professionally knowledgeable regarding their jobs, tactics, equipment, logistic and administrative support, etc. The impression created by one sloppy preflight or one vague or illogical answer to a key tactical question can undermine the image of an entire unit and the confidence of Allied units in that U. S. unit's ability to accomplish the combat mission. Developing an ever increasing level of professionalism is a worthy goal regardless of the setting. The interoperability requirement in Europe merely adds incentive to achieve that objective. Thorough knowledge of U. S. tactics for the employment of our aviation assets is doubly important since, like SOPs, our tactics provide a base from which adjustments can be made to complement Allied tactics and their exercise scenarios.

Another reason for thorough knowledge and total professionalism is that most Allied units expect to be taught the tactics, capabilities and limitations of the U. S. aviation element. This teaching, through both formal and informal sessions, is accomplished more easily when the assumed expertise is, in fact, possessed by the American personnel. As a word of encouragement, when operating with Allied units the teaching exchange is mutual. U. S. crewmembers and leaders who are re-

ceptive will invariably learn and will become better and more valuable members of the NATO combined arms team. Allied solutions to the problems of camouflage, field maintenance and NOE navigation have been adopted, in whole or part, by many U. S. aviation units.

Early, continuous and intensive coordination between Allied and U. S. Army elements must be effected. One of the most difficult problems for many units is to shift from a "reactive" role to an "active" one. Aviation units are particularly prone to "reacting" from a mission standpoint. This problem must be recognized and overcome in order to devote the time necessary to effect coordination with appropriate Allied staff personnel and commanders well in advance of planned exercises or commitment. Detailed planning pays off handsomely in improved mission performance. During one recent major exercise in which the antiarmor assets of the 334th Aviation Company were attached to a German corps, the corps planning had taken place over more than a year and initial liaison between key U. S. unit members and German staff officers began with nearly 6 months lead time. Detailed exchange of tactics, logistical and administrative requirements was completed during the final 60 days leading up to the operation as 334th members presented formal briefings on the unit's equipment, tactics, capabilities and limitations. Final coordination was continuous for the week prior to the actual field deployment. Yet the exercise still proved frustrating primarily because of incomplete coordination and inadequate communications. For example, 334th leaders and liaison officers were totally unprepared for how quickly the German units were able to move both their ground units and, more particularly, their command post locations. It is dismaying to return only hours following a coordination meeting at a division CP and find not only that the CP has moved, but that there is literally no trace of its former presence. Few if any U. S. units have a similar degree of mobility.

With the rapid shifting of command posts and tactical units which characterizes Allied operations, an appreciation of the importance of continuous coordination can be gained. Adequate coordination with allies requires mutual exchange of liaison officers equipped with both communication and transportation. The normal procedure of the 334th is to place liaison officers with each supported Allied brigade plus the division headquarters. Normal TOE limitations regarding radios, vehicles and personnel make this a costly requirement for any U. S. Army aviation unit. It is much less

Sikorsky CH-53 belonging to the Federal Republic of Germany

NATO maneuvers in Norway

costly than the alternative mission failure due to lost contact and no coordination. When possible an Allied LO is requested. Linked into his own unit's radio net and knowing their tactics and language, he aids in maintaining continuous coordination and reduces the chance of lost commo between the U. S. and Allied units.

U. S. units and crews must be prepared to communicate in a language other than their own. It is a too often ignored fact that none of our NATO Allies speak "American" as their native language. The British speak English, which is very close (not considering the accent) but how many American crews would recognize the words "bowser," "lorry" or "marshaller"? [A bowser is a refueling truck; lorry is a truck; marshaller is a ground guide.] Almost all NATO Allies are more fluent in "American" than we are in their languages, but it is nearly impossible to effect coordination of required aviation support to an Allied ground unit, in English (American style), at levels below a brigade headquarters. In one challenging interoperability experience, U. S. attack helicopter elements had to coordinate support for both a German and a French battalion located next to each other, with neither of the two adjacent battalion commanders speaking either English or the other commander's language. Only a marginally trilingual Aviator precluded a tactical equivalent of the Tower of Babel.

It is impractical to require all U. S. Aviators to become fluent in the multiple NATO languages. It is quite practicable, however, to conduct basic language training in at least the host nation language for all assigned Aviators/leaders of U. S. Army aviation units outside CONUS. For most units in USAREUR the language is German. General George S. Blanchard, CINCUSAREUR, recently established a policy that *all* E-7s and above in USAREUR will receive a basic block of German language training, with priority to those in key positions. The 334th has attempted to build its key personnel's language proficiency through a "Deutch (German) for Lunch" program where military members plus interested wives meet daily from 1100 to 1300 for basic language training. After this 4-week, 40-hour beginning course more advanced language training will be scheduled.

While a unit's personnel are slowly building language proficiency, unit operations officers and commanders can achieve an interim improvement in the ability to communicate with non-English speaking Allies by tailoring crews. Most larger aviation units have a few members, officer or enlisted, with fluency in the host nation language. These linguist-crewmembers should be teamed up with unit commanders to improve essential communication and coordination.

An advantageous way to build and use existent or developing language proficiency is in the selection and assignment of such crew mixes for briefings, displays and demonstrations where host nation military or civilian personnel will be present. This not only adds to the potential informativeness of the presentation but can be of significant value to the image of U. S. Army aviation. Our allies are invariably surprised and delighted to be addressed in their own language by Americans.

The demands of interoperability pose major new challenges for U. S. Army Aviators and aviation unit commanders in Europe. These demands have increased with the growing awareness by key U. S. and Allied military leaders that aviation units are not only mobile but, with the advent of the AH-1 Cobra TOW, devastatingly lethal against enemy armor. These assets, currently in short supply, must be able to be committed at the critical point of the battle, whether in support of U. S. ground elements or those of our many NATO Allies. Total professionalism by U. S. Army aviation personnel, early and continuous coordination, plus increased proficiency in languages other than "American," will contribute significantly to the effectiveness of multination combined arms operations. Essential to the continued successful NATO defense of Western Europe, *interoperability is the NOW challenge in Europe for Army aviation.*

Captain Don A. Mynard
Directorate for Aircraft Accident Analysis and Investigation
USAAAVS U. S. Army Agency for Aviation Safety

TERRAIN FLIGHT INTERNATIONAL

DURING THE 13th meeting of the NATO Flight Safety Working Party in July 1975, a study entitled Flight Safety Implications of Helicopter Low-Level and Nap-of-the-Earth (NOE) Operation was approved. The U. S. Army was requested to make a report on this study at the next meeting.

USAAAVS compiled a questionnaire in conjunction with the U. S. Army Aviation Center, Ft. Rucker, AL, and distributed it for reply in November 1975. The questionnaire went to all NATO countries and selected aviation units throughout the U. S. Army. Nine NATO nations and three Army agencies responded to the 14-part questionnaire. Following is a consolidation of their answers:

1. *In your concept of NOE (terrain flying/low level) operations, do you intend to depend solely on the pilot's ability to navigate using a map or will the map be supplemented using electronic navigation? What scale map is being employed in NOE? Are you developing a map specifically for NOE?*

Nations and agencies responding to the questionnaire were almost in total agreement that the 1:50,000 scale map is the best map for NOE navigation. The 1:25,000 scale map was considered unsuitable, but the smaller scale maps—1:75,000 or 1:100,000—were recommended to be better for NOE navigation. One country has a 1:250,000 map under development, which will be printed in two versions, one for day and one for night. An injected plastic map was tried by one country, but proved to be cumbersome and could not be folded without damage. Making the copilot responsible for navigation during NOE was indicated as being extremely desirable by most respondees (using the 1:50,000 map augmented as necessary) in order to free the pilot from the navigational task so he can devote his attention and energy to safe flying. A few responses indicated that while electronic navigational means may be used in the rear area, it should not be used in the forward battle area.

2. *In training your pilots for NOE operations, do you have a minimum altitude for tree, wire and bridge clearance?*

The minimum clearance requirements for flying under wires, bridges, etc., during NOE operations recommended by the U. S. Army are:

OH-58 - 20 feet* + hover height
OH-6 - 17 feet* + hover height
UH-1 - 25 feet* + hover height
AH-1 - 25 feet* + hover height

For initial student training, the wire clearance is recommended to be 50 feet vertically and 100 meters horizontally when flying parallel to them. However, during NOE training operations within special low-level routes or areas, pilots of some nations are directed to maintain a minimum altitude of 10 feet above trees, wires and other obstructions. Some nations do not fix a minimum altitude for tree, wire and bridge clearances for NOE training operations.

3. *Do you intend to use some type of electronic wire detection device or a mechanical wire cutting device on your helicopter? What methods do you use to cross wires and bridges at NOE altitude during training and actual operations?*

At this time no mechanical wire cutter is envisioned. One nation indicated a continuous review of possible electronic detection devices; however, none are sufficiently reliable to contemplate more than a paper study at present. During training, wires are crossed usually at the pylon (pole). During actual operations, the most appropriate method used will depend on the judgment of the pilot. Many responses indicated that aircraft are permitted to fly *under* wires.

4. *What is your concept for command and control of aircraft operating at NOE altitudes?*

The Vietnam concept of a command and control (C&C) aircraft is antiquated. A C&C ship is used during NOE training for safety purposes only. Decentralized control to "battle captains," that is, the platoon leaders and troop commanders who will fight the battle and will be in an NOE environment in the forward battle area, is envisioned. As a minimum, troop commanders need one UHF, one VHF and two FM radios for adequate communications. The use of

*Exterior aircraft height, aircraft on the ground, flight controls neutral plus a 10-foot margin for error

secure modes of communication is necessary and radio relay ships are anticipated. Radio relay aircraft may be tactically flying NOE or in a static, well-camouflaged location operating with outside electrical source. The C&C aircraft must operate in the same envelope as the operational aircraft to avoid enemy detection.

In general, command and control procedures of aircraft operating at NOE altitude are usually decided in the planning phase of the operation. This ensures a positive communications net and establishes checkpoints and reference lines from which pilots report their position. Liaison with ground units is assured, if necessary, by aircraft performing radio-relay missions and/or ground stations. Generally, NOE flight is performed by a two-aircraft patrol under the orders of the leader who also commands one of the aircraft. Patrols are under the orders of the flight commander who flies at the rear position at an altitude that permits him to maintain radio contact with the patrols.

5. *Are you developing any new communications equipment to be employed in NOE flight?*

Anticipated heavy enemy electronic warfare will require new communication concepts. Hand and arm signals and flash cards with prearranged symbols for orders have been used successfully. In addition, light signals can be used to communicate during battle. Innovative and inexpensive techniques are considered to be the answers rather than placing additional heavy and cumbersome communication equipment on board the aircraft. One response indicated the short-term solution for communications during NOE flight in combat will be a combination of airborne retransmission and a high frequency single sideband radio. The long-term approach will include satellite communications. Overall, the solving of the command and control problem for the NOE concept might lead to a requirement for totally new communication systems and equipment. It all depends on how far we are prepared to go in this area. One type of radio that is envisioned at this time is a radio that can selectively vary the power output through low-to-high range and back again.

6. *In your concept of operations, do you intend to employ cargo handling (medium- and heavy-lift) helicopters in NOE flight?*

Internal and external loads can and will be delivered by aircraft flying NOE. The most stringent requirements based on survivability considerations are that sling loads be carried as close to the surface as possible and as close to vegetation and obstacles as safety of aircraft and crew will permit. Occasionally this may require an external load to make contact with tree branches, crowns and high grass. The altitude for carrying external loads is determined after the following factors are considered: enemy threat, route, aircraft lift capability, pilot proficiency, type load (weight and configuration), terrain, weather, density altitude, wind, and day or night operations. Medium-lift and cargo helicopters can be used at very low altitudes—50 meters or 150 feet—but all the obstacles should be overflown.

7. *What techniques are being developed to avoid enemy detection and weapons fire to include missiles?*

Small arms. It is recommended that the helicopter be turned immediately away from the fire toward an area of concealment. If concealment is not available, sharp turns of unequal magnitude and at unequal time intervals provide the best protection until the helicopter is beyond the effective range of small-arms fire. If the situation permits and the weapons are available, immediate suppressive fire should be employed on the areas from which the fire is coming.

Large caliber antiaircraft fire (radar-controlled 23mm, 37mm and 57mm). When this type of fire is encountered, it is recommended that an immediate 90-degree turn be executed to move the helicopter away from the burst. After turning, a straight line of

flight should never be maintained more than 10 seconds before initiating 90-degree turns. Through all turns and straight lines of flight, an immediate descent to a low-level or NOE altitude will reduce the danger.

Heat-seeking missiles. Evasive action should be to either mask the helicopter behind or in front of terrain features. The most effective countermeasure for this type of antiaircraft threat is for the pilot to make all approaches and attacks from the direction of the sun. There were indications that equipment is being developed to warn the pilot when he is in the vicinity of the enemy's visual or electronic detection capability. Overall, reliance is likely to be placed on NOE flight as the best method to avoid visual or electronic detection from the ground. Careful map reconnaissance is required to select the route to and from the target area which offers the greatest cover and concealment from the opposing forces' view.

8. *What techniques have you developed to deliver ordnance/fire weapons at NOE altitudes?*

All ordnance can be delivered from NOE and hover altitudes and during popup maneuvers. Long-range 2.75 FFAR, 20mm, 40mm and 7.62mm systems have been successfully employed from NOE and hover fire positions. The delivery relies on normal boresighting methods and adjusting aircraft attitude for range corrections. It has been determined that Cobras using popup firing techniques can engage enemy targets with TOW missiles, but it takes extensive training. One nation reported that helicopters carrying missiles are equipped with two magnifying power telescopes (both binocular type and monocular type for the missiles that are spin-stabilized).

9. *What concepts are being developed to logistically support aircraft operating NOE in the forward edge of the battle area?*

The general response to this question was "none specifically." The logistical support for Army aviation is basically the same and is not related directly to NOE techniques. More important is the huge amount of supplies required over a large front or area to support large aviation elements. Logistical support through placement of forward support areas, forward area refueling/rearming points, and the use of prepackaged loads are some concepts being used. In the foward parts of the battle area—that is at brigade or division level—supply centers for helicopters will be installed and manned by aviation logistical personnel. These centers will store fuel, antitank missiles and other material in small quantities for rapid replenishment of aviation force.

10. *In your concept of operation, do you plan to operate NOE at night and in adverse weather?*

With the need for tactical proficiency, extensive instrument training will be deemphasized and visual day and night navigational exercises will be conducted to simulate those used in a high-threat situation.

There is certainly a tactical advantage in operating NOE under these conditions. The question was also raised in one response—"What about flying under chemical, biological and radiological conditions?" Currently, units are planning to conduct one-third to one-half of their tactical flying at night but will emphasize the necessity to fly under nuclear, biological and chemical conditions.

11. *What type training, i.e., day, night and instrument do you plan for your pilots for NOE combat operations?*

After finishing the Euro-NATO-Training at Fort Rucker or the equivalent course at the Army Aviation School in Germany, the aviators get followup training in three phases. These include low-level training with the variants defined:

- Low-level flight is the general expression for each flight below 500 feet.
- Tactical flight is every low-level flight in execution of a tactical training mission largely taking advantage of terrain features and ground coverage. Tactical low-level flight consists of contour flight, prowl flight and stalk flight.

Contour flight means taking advantage of terrain features and ground coverage at normally constant speed but variable altitudes.

Prowl flight is low-level flight at extreme low altitudes with steadily changing flight directions and variable speeds down to hover.

Stalk flight, a part of prowl flight, is that portion in which the helicopter approaches the enemy, once visual contact has been established, remaining hidden, however, from enemy reconnaissance and fire.

Low-level training in the German Army aviation system starts during basic training with training flights at altitudes of 300 to 100 feet.

A following tactical flight course of 50 hours mostly consists of tactical low-level flight training. This training is being exercised in a step manner with many repetitions before adding new tasks.

The first step is the handling of the helicopter in a low-level environment on a standard low-level route over terrain familiar to the instructor and student. Later, terrain is used which is familiar only to the instructor, the objective being to get the pilot down into the NOE environment.

The second step is navigation in a low-level environment. The student is trained by numerous flights at altitudes of 300 feet down to 10 or 100 feet after inten-

sive map studying and at an advanced stage by flights in unknown terrain where navigation is done by memorizing the flight sectors from observation halt to observation halt.

Transportation helicopter pilots receive additional instruction in formation low-level flight. Another important part of the tactical flight course which has to be integrated in low-level training is tactical flight conduction, which means utilizing and taking advantage of terrain features while taking into consideration the specific mission, enemy threat and environment.

Additional training in tactical low-level flying is being given to the pilot in his unit, where he has to complete his combat training program, which is mostly NOE flight, every year.

The tactical flight course and combat training program include the use of instruments in NOE flight during both day and night.

Primary emphasis will be on day and night NOE training and on annual NOE standardization rides. Aviators will be tested on their ability to transition to instrument flight for return to the base airfield.

12. *What is your minimum crew requirement (for NOE)?*

A pilot plus observer (navigator) should be on board during actual NOE flight. It is also desirable to utilize a crew chief, when practical, in addition to the pilot/observer team. However, the crew required for any particular aircraft operation should suffice.

One reply indicated that, before a pilot can be trained for NOE flight, the pilot must have a minimum of one year's service as an operational pilot.

13. *Do you have a minimum crew rest period between NOE flights?*

The basic crew rest is 8 hours sleep in a 24-hour period and a 12-hour duty day. To date, however, there is no set limit of hours of NOE flying in any one time period.

But one response established a maximum of 5 hours of NOE flight time in any 24-hour period. These aviators did not spend more than 8 hours on the job without resting for 3 hours before reporting for a mission.

It is likely that current regulatory limits of 140 hours combat time during a 30-day period for pilots (crews) will have to be reduced for those units which habitually conduct terrain flying. This is due primarily to the increased stresses associated with this type of flying.

14. *Do you have any medical restrictions that prevent an aviator from flying NOE?*

Unless special individual circumstances exist, all medically qualified helicopter pilots are considered suitable for NOE flying. Medical categorization of aircrews is being studied further and new developments regarding the aeromedical aspects of helicopter flying, in general, and NOE, in particular, may be in the offing. Overall, the response to this question was negative.

It is obvious that there are wide differences among the NATO nations concerning NOE operations. However, the results of this study and the responses to this questionnaire presented by the Army at the 14th meeting of the NATO Flight Safety Working Party will provide the basis for recommending a new NATO standardization agreement. In addition, a recommendation will be made to change the term *nap-of-the-earth flight* to *terrain flight*, a broader and more meaningful term relating to battlefield survivability.

USAAAVS

35,000 accident-free flying hours

CW2 Joe S. Adams II

a good safety record is no accident

AS OF 1 April 1976, the 11th Aviation Group (Combat) had 18 months and more than 35,000 hours of accident-free flight.

This ongoing achievement is being accomplished by the Group Headquarters and its nine subordinate units flying numerous types of missions in a variety of aircraft. These units are the 71st, 73rd, 180th, 207th, 295th and 334th Aviation Companies and the 1st, 5th and 357th Aviation Detachments. Aircraft flown by these units are the UH-1, AH-1, OH-58, CH-47, CH-54, OV-1, U-21 and C12.

Significant in this accomplishment is the great number of hours flown at night, in tactical terrain flight to include NOE, and in support of major combined arms exercises such as REFORGER and Alpine Friendship which were held under typically adverse European weather conditions. In addition, many hours were flown under "clear of the clouds, 1/2-mile visibility" criteria, with both "hot" refueling and underwire flight authorized.

The major contributing factors to the accident-free record in addition to outstanding maintenance and pilot professionalism are:

Precautionary landings. There is a great deal of command emphasis on precautionary landings. In other words, if there is any indication of a problem, land the aircraft at the nearest available safe area and see if a problem does exist. There is absolutely no stigma associated with making a precautionary landing. Let's face it; continuing to fly when you are not sure that your aircraft is 100 percent is dumb! Precautionary landings indicate professionalism.

Crew scheduling. Crew scheduling and selection is not done by roster. A new pilot is always scheduled with an experienced one. In this way the inexperienced pilot learns the ropes, so to speak, and in time assumes his role as a trainer of newer pilots.

For the past 3 years, CW2 Adams has been assigned as the aviation safety officer for the 11th Aviation Group. He is rated in the Cobra and has more than 1,000 combat hours in the aircraft. He is also a graduate of the University of Southern California Aviation Safety Officers Course.

Increased standardization and aviation training. As mentioned in other articles in this issue, 11th Aviation Group aviators are undergoing extensive standardization and training in areas such as advanced terrain flying techniques, night terrain flying, tactical instrument flying, and operational mission training in preparation for combined arms exercises. All of this serves to sharpen skills, increase confidence and raise the level of our aviators' professionalism.

Professional aviation safety officers. Each Group unit has a school-trained aviation safety officer (ASO) assigned. This is a full-time job and no additional duties are authorized. In fact, the ASO slot is in the headquarters section of the TOE, and the safety officer reports to and is rated by the company commander. The ASO is president of the unit Aviation Safety Council and also flies as a mission pilot to observe unit safety awareness. In addition, each unit has an Enlisted Safety Council made up of mechanics, crew chiefs, etc., and the Group has an active Individual Flight Safety Award Program.

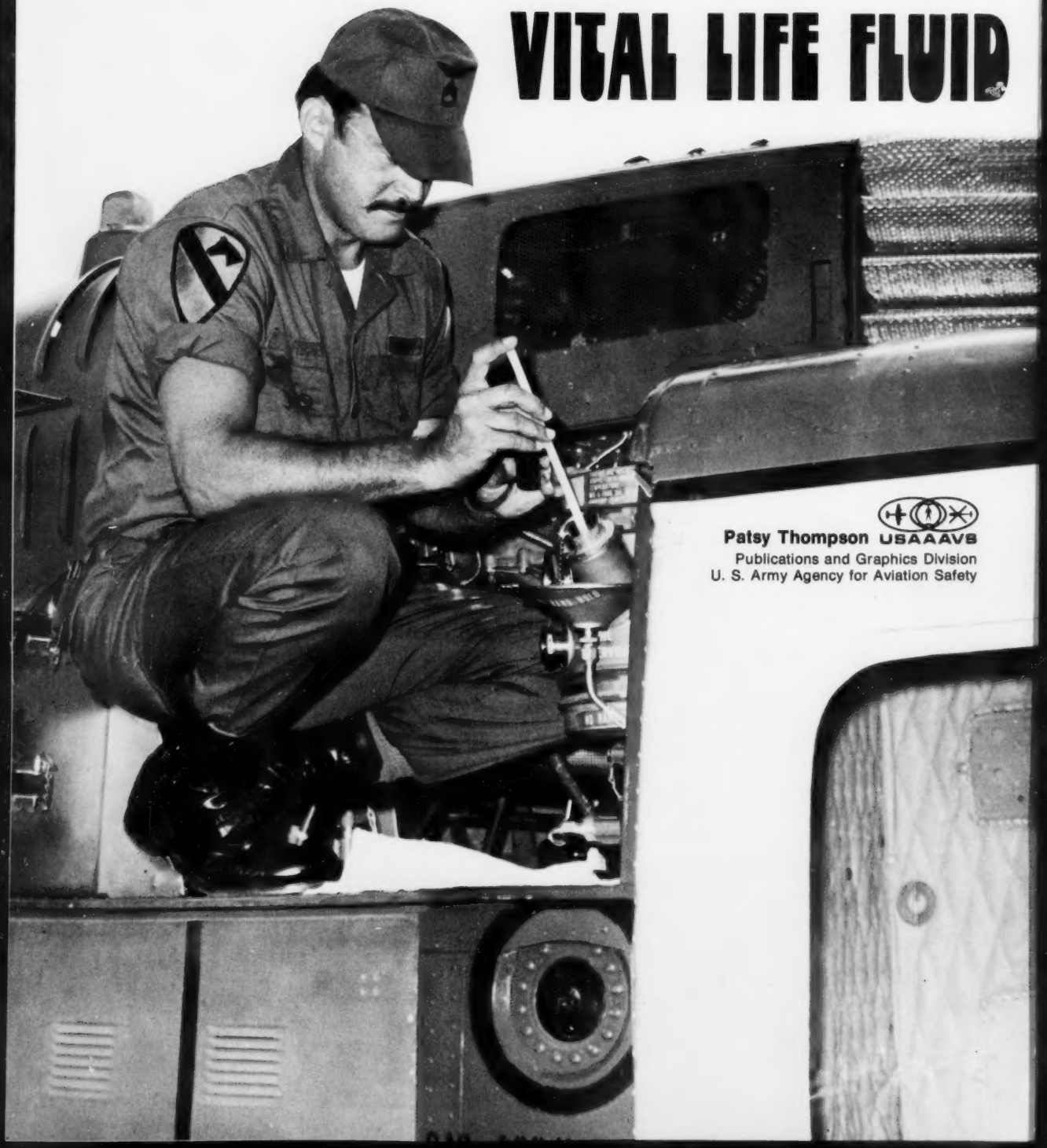
Always looking for new ways to improve its safety program, the 11th Aviation Group took a hint from the January 1976 issue of the *AVIATION DIGEST*. During February and March 1976, each unit assigned to the Group performed a "what if" aircraft accident investigation.

What is a "what if" accident? Choose any routine flight, and while it is gone, appoint a complete accident investigation board in accordance with AR 95-5. When the aircraft returns, take the board out to the aircraft, inform the pilot that he just had a simulated accident and set the board to work. All required forms are completed and every aspect of the flight is investigated to include maintenance of the aircraft, medical factors, flight planning, procedures, etc. The only limiting factor in this exercise is the incentive and imagination of the board.

Upon completing their investigation, the board submits its report to the unit ASO, and he checks it for completeness and content. Thus we have exposed five boardmembers and an ASO to a very significant learning experience.

This article typifies what we always allude to affectionately as "professionalism!"

VITAL LIFE FLUID



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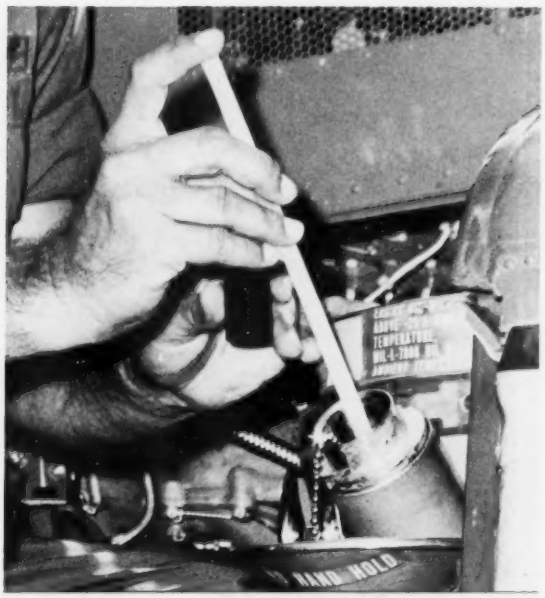
Through early detection of worn parts and impending component failure, the oil analysis program is a valuable accident prevention tool



IT HAS BEEN more than three centuries since the English physician, William Harvey, discovered that blood circulated in the body of man. Since this time, man has been discovering more and more about the properties of this vital life fluid. It is now standard practice for a doctor to take a sample of a patient's blood and, through an analysis of the proteins, salts, sugars and wastes, get an excellent picture of the individual's health. Based on this analysis, he can take preventive measures to correct a potentially serious condition. Alternatively, he might have to take immediate corrective measures because of what the analysis reveals. In comparison, this is precisely how the Army's oil analysis program works.

Oil analysis is essentially a maintenance tool used for diagnosing the internal condition of engines, gearboxes, transmissions and other oil-lubricated and hydraulic systems and components. Metal particles of microscopic size are produced by the friction of moving mechanical parts which enter the oil system and are dispersed and suspended throughout the lubricating oil system. By analyzing oil samples taken from these systems at specific time intervals, abnormal wear of parts can be detected by abnormally high levels of metal concentrations. Any worn part can

When taking samples through the filler neck, tubing should not be allowed to touch the sides or bottom of the tank to avoid sludge. Oil should be taken from approximately the same depth in the reservoir each time

then be repaired or replaced before it causes damage or failure of the entire assembly or mechanical system. It is through this early detection of impending equipment component failures that the oil analysis program has become an invaluable tool for enhancing the Army aviation accident prevention effort.

Oil sample analysis can be compared to a computer readout in that the final outcome is unreliable if the operator feeds it incorrect information, whereas oil samples are useless to the laboratory and a waste of time if improperly taken.

In accordance with Technical Bulletin 55-6650-300-15, 5 August 1970, with changes 2, 3 and 4, the two basic procedures for taking oil samples are the tubing method and the drain method. The tubing method is preferred over the drain method, whenever possible, as tube samples are less likely to contain sludge and dirt than drain samples. The disposable, plastic flexible tubing, which comes in four lengths and diameters to meet the requirements of various aircraft, is used to obtain oil samples through the oil filler neck or the dipstick hole. When taking a sample through the filler neck, the tubing should not be allowed to touch the sides or bottom of the tank in order to avoid sludge, and the oil should be taken from approximately the same depth in the reservoir each time. Samples are properly taken by inserting the tubing into the reservoir, allowing the tubing to fill with oil and placing the fingertip over the top of the tubing. The tubing is then removed and placed in the sample bottle (NSN 8125-00-933-4414), and the finger is removed from the end of the tubing to release the oil (see figure 1). This procedure is repeated until the sample bottle is filled to within one-half inch from the top of the bottle. Some individuals are using mouth suction to fill the tubing with oil. This method is dangerous and should not be practiced as some oil is very toxic.

The drain method (figure 2) is used when the tubing method is impractical, such as for transmissions. To prevent sludge or water from contaminating the oil, a minimum of one pint of oil must be drained before taking the sample. A quart container, such as a coffee can, can be fitted with a wire bracket designed to hold the sample bottle at the top of the can. This allows the oil to be drained into the can before the sample is taken. It also allows the sample to be taken with one hand and frees the other hand to replace the drain plug.

Both the tubing and drain samples should be taken while a major assembly is still warm, and a *clean* bottle and tubing or coffee can always should be used. The best time to obtain a sample is within 15 minutes after an engine shutdown or an aircraft landing. If a sample must be taken and the aircraft is cold (other than after an accident) the system must be run until it reaches normal operating temperature or else the oil is not truly representative of the oil circulating in the

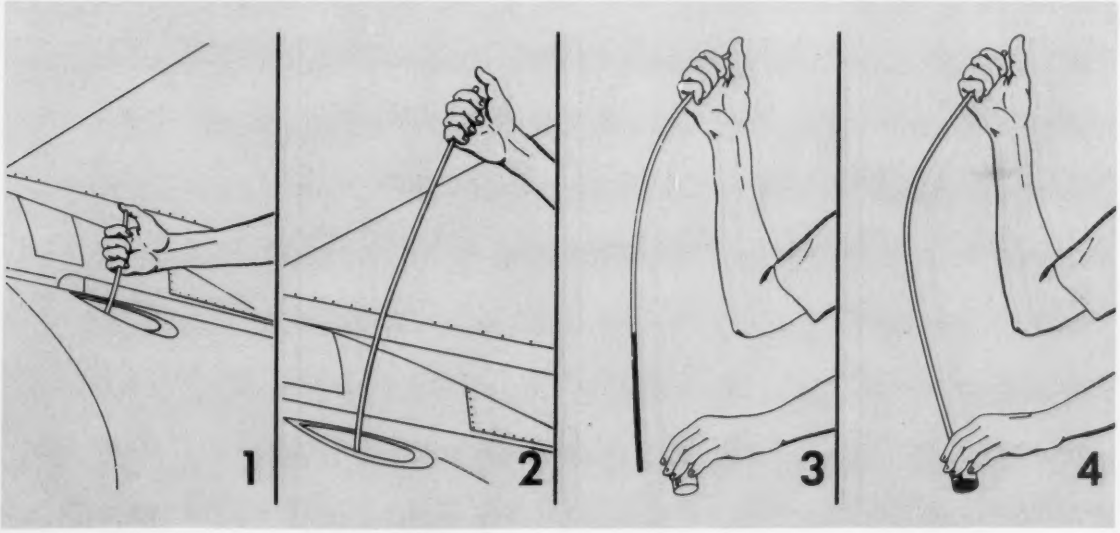


FIGURE 1—Taking filler neck sample using flexible tubing

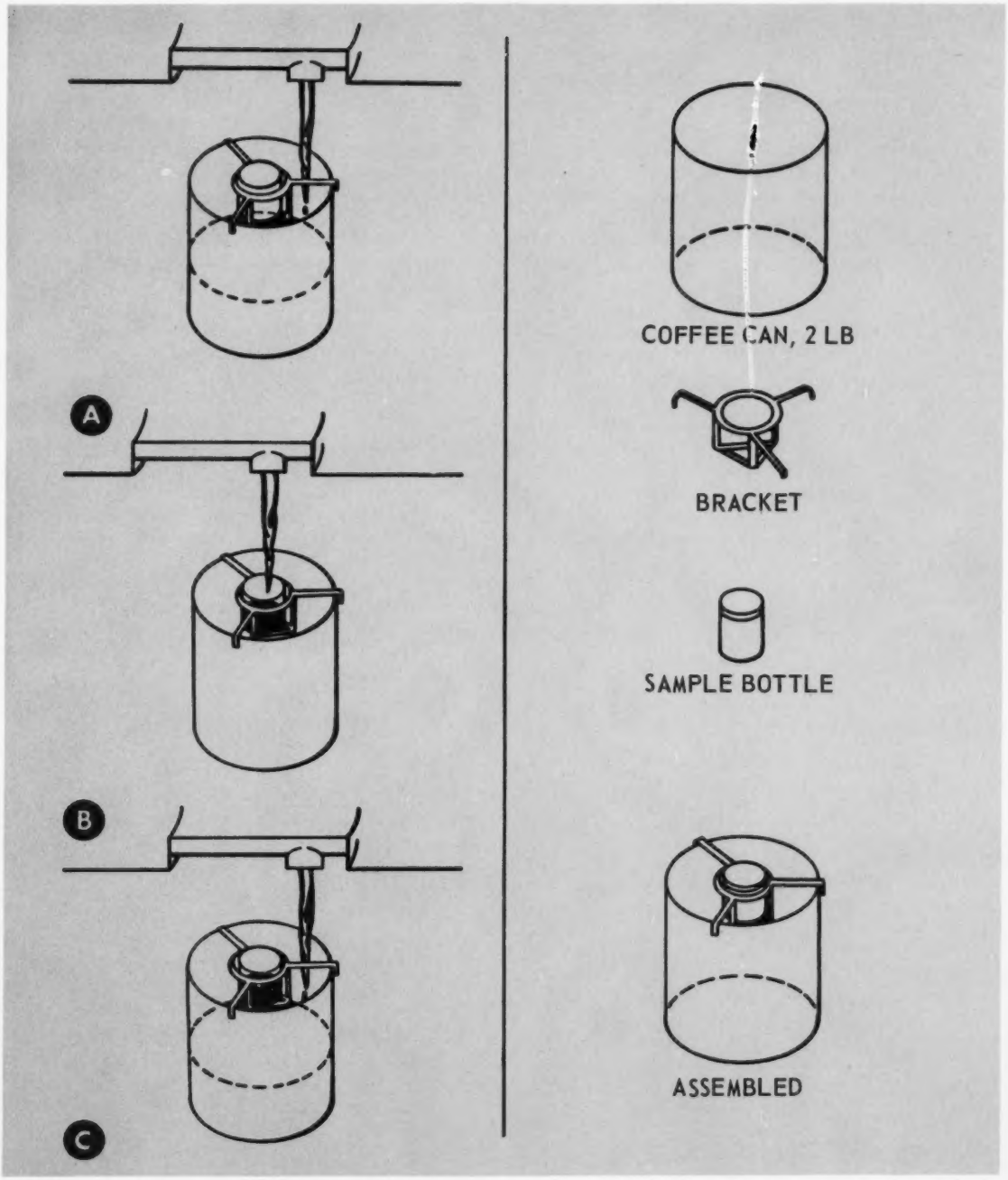


FIGURE 2—Taking drain sample using locally made kit

system. If a sample is taken while the system is cold, it is very ineffective as an indicator of defects or condition of wear in an assembly.

There are several variations for sampling the hydraulic system, transmission and gearboxes. The tubing method can be used to sample the hydraulic reservoir, provided it is a part of the circulating system; the drain method can be used for sampling the filter housing; or the sample can be taken from a line that circulates the fluid. The transmission and gearboxes can be sampled with the tubing by either removing the magnetic plug and inserting one end of the tubing into the sample bottle or by displacing the check valve with the other end of the tube and drawing off the oil.

After the sample has been taken, DA Form 3253, dated 1 November 1972, should be accurately completed, wrapped around the oil sample bottle and secured with a rubber band. The sample should then be sent to the assigned laboratory immediately as the effectiveness of the oil analysis program depends on the response time; that is, the time consumed from sampling, transmission time of sample, and laboratory analysis time and the time to inform the operating unit of a recommendation made by the laboratory evaluator. Program effectiveness decreases when there is an increase in response time.

There are three types of oil samples—routine, special and resample.

Routine samples are taken from most components after every 25 hours of operation. However, it should be noted that turbine engines are always sampled after every 12½ hours of operation. Oil samples must be systematically taken at the regular intervals specified in table 1, TB 55-6650-300-15, for the systems involved; at times when trouble is expected; and after the last engine/assembly operation immediately before each intermediate and periodic inspection. Samples taken at prescribed time intervals are of utmost importance in revealing any progressive increase in wearmetal or abnormal wear within a system on which to base corrective maintenance actions. While it is true that the operating time between an incipient and total failure of a system may vary from a few minutes to 80 hours or longer, it would be impossible and impractical to take routine samples after each flight. Therefore, the routine sampling intervals for each major assembly is a compromise based partly on what is practicable, partly on operating conditions and partly on the failure history of the assembly.

In addition to the routine samples, special samples and resamples are required as follows:

- When there is a sharp increase in the wearmetal content in the oil or there is dirt or sludge in the oil indicating that the sample was not taken properly.
- After an aircraft accident, regardless of its cause.
- Before any oil change or intermediate or periodic inspection.
- Immediately following any flight in which there was a failure, an overboost or overspeed, or any abnormal flight condition which may have been the result of a malfunction of oil-lubricated parts or damage to an oil-lubricated system.
- After any indication of internal damage to an oil-lubricated major assembly.
- After chip detector light comes on.
- Before the removal of a major assembly regardless of the reason, including time between overhaul.
- Before an aircraft is deployed overseas.
- Before performing maintenance on any oil-lubricated assembly and parts and immediately after ground run following maintenance on any oil-lubricated assembly or parts (this includes repairs, replacement or installation of any time change parts or assemblies).
- After engine overhaul and at the completion of the test cell run and after functional flight.

The special samples will be clearly marked "SPECIAL" and banded with red tape or marked in some other conspicuous way so that they will be given priority by the laboratory.

The success and overall effectiveness of the Army's oil analysis program depends on the timely testing and analysis of reliable oil samples. Individuals must ensure that samples are not contaminated, are properly taken and identified, are taken at the proper intervals and are dispatched to the laboratory immediately, along with accurate "Used Oil Sample Information," DA Form 3253, dated 1 November 1972. An oil sample, as small as it may seem, can detect a serious problem which could save lives or an aircraft.

To aid unit personnel in the proper sampling methods, a new safety film, TF 46-4943, "The Army Oil Analysis Program—Aviation," was released the latter part of 1975 and is now available through Audio-Visual Support Centers. This film discusses requirements for participation in the program and gives examples of how the program has been able to identify potential failures of engine and other vital oil-wetted aircraft systems.

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Fifth in a series of episodes on George, your unit ASO, who died from frustration after his training had taught him the professional approach to safety

Who Killed George?

THE AGED mechanical sweeper sat idle, gathering rust. George made his way around it, looking, touching and, occasionally, probing into one component or another. But his actions were strictly a formality. He already knew the problem. The machine was simply inoperative—broken down—"kaput." As a matter of fact, it had become inoperative several weeks before his recent assignment to the aviation unit. Well, he surmised, you have to take the bad along with the good. When you take over another man's job, you reap the benefits of his efforts all right, but you also inherit his problems. And this one was a real "goodie."

Because of its locale, the airfield was plagued with small rocks and pebbles that were indiscriminately strewn about the airfield proper, if not by wind and rain, then by the rotorwash from whirling blades of operating aircraft. Nicked rotor blades, windshields and inlet guide vanes were common results. Fortunately, as yet, no major mishaps had occurred—only a couple of precautionary landings. But there was no way of telling when undetected engine damage might cause engine failure and a more serious type of mishap.

In addition, these small rocks and pebbles served as a constant source of irritation, lengthening aircraft down time during inspections and maintenance. When, for example, a nicked inlet guide vane was found, there was no way of determining the source of the FOD and whether or not more severe damage to the compressor blades or the hot section of the engine had occurred—without performing a more thorough, time consuming engine inspection. Without a doubt, the situation needed to be resolved. But getting the sweeper repaired was out of the question. The repairs needed were major ones, and the aviation unit lacked the necessary funds. Further, because the sweeper was old, funds for repair were not likely to be appropriated in the future.

George was still musing over the problem as he made his way to his quarters. If only the airfield could be kept as clean as the Post streets. The Post streets! That was the answer. Didn't a mechanical sweeper churn its way daily over these streets? Why not make arrangements with Post Engineers to use theirs—at least as a temporary measure.

Enthusiastically, he rushed into his quarters and reached for the phone. In short order he found himself explaining the situation to a sympathetic listener at the other end of the line. "Don't see why we can't," the voice was saying, "but I don't have the authority to give you the go-ahead on my own. Let me get back to you."

"Fine, fine!" George found himself saying as he returned the receiver to its cradle. Cooperation—that was the key word. Why not? After all, they were all one big family.

The receiver was back to his ear almost before the ringing had stopped. "No sweat," the voice was saying, "you folks can use our sweeper. All we need to do is set the dates. How about 30 June and 31 December?"

George didn't understand. "June 30? December 31?" he found himself asking.

"That's right," the voice replied. "It's all yours—twice a year. I'd like to give you more days but the JAG office is loaded with claims for broken windshields and chipped paint on POVs. The CG wants these claims reduced and has made streetsweeping one of his top priorities. . ."

The voice trailed away as George slowly lowered the receiver. His mind went back to the sweeper parked at the airfield—immobilized, rusting. Right now, he felt about as impotent and lifeless as it was. And like it, he, too, was rapidly corroding away.

ASK A YOUNGSTER if he can ride a bike or if he can swim and instinctively he will show you rather than answer you. This go-go-go, positive thinking, can-do attitude comes naturally. It is not only a desirable quality but also an essential one if we are to accomplish our goals in life.

But this can-do attitude and strong desire to succeed must be tempered with a good deal of commonsense. Commonsense is sound, prudent judgment. Unfortunately, commonsense is sometimes overpowered by a can-do attitude. This is when we exceed our abilities and get into trouble. The following accident bears this out.

After a night flight briefing, an instructor pilot (IP) and two student pilots (SPs) went to the flight line and preflighted the UH-1H. They took off after dark. The IP was in the left front seat, one SP in the right front seat and the other SP in the jump seat.

About an hour and 15 minutes after departure, while en route to the landing zone (LZ), a weather recall to home base was made. The IP continued on to the LZ, where the student pilots exchanged places. About 40 minutes after the weather recall, the IP reported for landing at home base. The tower advised the crew that the field was below special VFR weather minimums (700 feet and 1 mile) and that a landing could not be approved. The IP then declared minimum fuel and requested landing clearance. He was told to stand by.

Army Radar Approach control told the tower to clear the aircraft for landing if it was an emergency. The tower complied and asked the IP for his position. His reply was "about a mile from the beacon." The tower cleared him for a beacon approach. (Five minutes had elapsed since the first request for landing.)

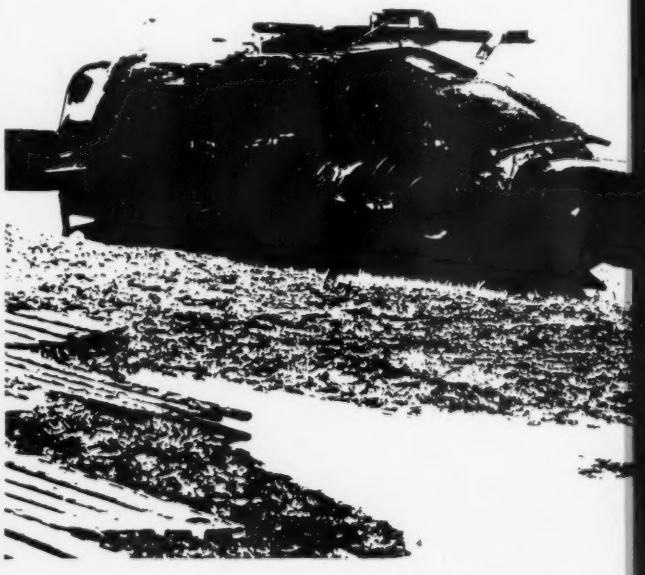
A few minutes later, the IP transmitted, "We're apparently past the field and about 1 mile to the north. We're going to climb. Missed approach." This was the last transmission from the aircraft. Shortly afterward it crashed and burned in a wooded area. All occupants were killed.

A review of the facts concerning this accident shows that:

Initially, the weather was forecast to be above minimums with intermittent thundershowers and ceilings of 500 feet overcast. Approximately 50 minutes after the doomed aircraft took off, a pilot's report (PIREP) indicated a fog bank and low clouds moving into the area of home base. The officer-in-charge ordered a recall from the field site to home base. This recall was made about 20 minutes after the PIREP. If all aircraft in the flight had reacted immediately, they probably would have arrived back at home base before the weather closed in.

The aircraft that crashed was the last one to start back to home base, about 20 minutes after everyone else. When the aircraft reached the home base approach facility, the IP was told that the field was below special VFR minimums.

The IP declared an emergency (low fuel condition—350 pounds), requested a special VFR approach and was cleared for the approach. Accepting such an approach under low-fuel conditions with no



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guarantee of breaking out VFR on the first try was poor judgment on the part of the IP. He should have changed his flight plan to IFR and made an instrument approach into another nearby airfield.

The aircraft was seen flying north of home base at low altitude at approximately the same time that the IP reported a missed approach and said he was going to climb.

It is suspected that the IP became spatially disoriented, lost control of the aircraft and crashed.

AR 95-5 states that "A weather element or condition is not always a cause factor simply because it exists; e.g., a pilot elects to make a descent with full knowledge of the existing conditions, and suitable alternates are available." Several alternates were available. Three of the aircraft in the same gaggle declared similar emergency fuel status and also requested special VFR approach. One of the three diverted to a nearby airfield and landed. Another was able to attain VFR conditions and landed at a field site. The third made it through and landed at home base. The fourth, which crashed, simply had too much going against it.

The only explanation is the strong desire in this unit to accomplish the mission regardless of flying conditions. The accident investigation board felt this desire for mission accomplishment was more at the individual instructor pilot level than at the command level. The instructor pilots' pride of accomplishment may have created this condition. Guidelines in the unit SOP regarding recall procedures may have instilled a sense of urgency in the IP's mind for returning the aircraft to the assigned basefield regardless of weather conditions.

The application of commonsense—the kind of commonsense expected of professionals—could have prevented this accident.

weather support change

PILOT WEATHER briefings should be improved by changes that will take place later this year in the CONUS base weather stations. A new weather communications system will replace the old teletype networks for delivery of weather reports and forecasts. Implementation of the new system, the CONUS Meteorological Data System (COMEDS), began in Texas in early July 1976. The entire system is scheduled to be complete by December 1976. It will operate at 1,200 words per minute and all network operations will be controlled by a computer located at Carswell AFB.

Terminals in the weather station will consist of a page copy printer, a keyboard and an electronic screen visual display. This new system will impact Flight Crew Weather Briefing and the amount of weather data displayed. As a result, far fewer files of "teletype sequences" will be posted in the weather station.

Chances are that the weather reports or forecasts required for specific routes will not be on file at the local weather station when you step into the weather station and request your briefing. In this event the forecaster/briefer will query the central data file in the Carswell computer by punching a few keys on the terminal of the new communications system and in a few seconds the information required for your flight will be flashed on an electronic screen similar to your TV picture screen. This "soft copy" not only will save time and resources in the weather station, but will also ensure that you are getting the latest weather information in the system.

WITHIN THE PAST year there have been two CH-46 accidents as a result of pilot vertigo after inadvertent entry into IMC (instrument meteorological conditions). There have also been other helicopter accidents with circumstances similar to the ones mentioned. It would be easy to ascribe these accidents primarily to the pilots' lack of instrument proficiency, and this undoubtedly is germane. But there are other important related factors which warrant consideration. This article will focus on the CH-46, but the discussion has relevance to all helicopters.

The problems associated with helicopter pilot vertigo following inadvertent entry into IMC will be separated into three categories: the machine, the weather, and the crew.

The machine. Helicopters, unlike fixed wing aircraft, are inherently unstable and are probably the most vertigo-inducing machines designed by man. They have a variety of vibrations or oscillations, produce high noise levels, and can induce flicker vertigo by the action of sunlight shining through the rotating blades.

What's more, helicopter pilots are limited in their unusual attitude recovery practice. Despite acrobatic maneuvers performed for publicity purposes by company test pilots, helicopters—particularly transport helicopters—were not designed to routinely perform such maneuvers. As a result, helo pilots do not have the opportunity to practice all-attitude instrument flight and thus build their confidence in maneuvers other than normal flight.

Properly maintained and *balanced*, the CH-46 is a very stable and well designed helicopter for low altitude instrument flight. I emphasize balanced because many helicopters regularly and safely fly with uncomfortable beats caused by blades out of track, weak rotor dampeners, or weak automatic trim systems. Sometimes, malfunctions in the stability augmentation systems (which maintenance doesn't know of or hasn't had time to correct) make actual instrument flight more difficult.

Furthermore, the CH-46 has its all-weather limitations. It does not have operable deicing equipment for the engines or windshield. It does not routinely carry oxygen equipment, and it's a challenge to fly in turbulent IMC.

The flight control system also poses some problems for instrument flight. Collective pitch lever and cyclic stick flight control feel in the CH-46 are introduced artificially through the use of centering springs and automatic trim system actuators. When the CDR (centering device release) button on the cyclic stick grip is depressed, the lateral, longitudinal, and directional centering springs are released, causing a loss of artificial feel (the stick is fairly loose). More impor-

tant, a reference point is lost. When the button is released, the centering springs are again engaged in a new position, restoring artificial feel and establishing a new center of reference for the control system.

The CP (collective pitch) lever brake trigger operates in a similar fashion. The centering device springs may be manually overcome at any time; however, when control pressure is released, the controls will return to their original position.

It may be already apparent to the reader that the pilot's technique in using the CDR switch and collective pitch brake trigger under IMC is very important. More will be said later about the use of these switches.

The weather. Although inadvertent entry into IMC by a helicopter pilot could occur at any altitude, the most critical, and the one this article will focus on, is close to the ground or other obstacles such as mountains, tall trees, or buildings. Because of the helicopter's capability to hover or maneuver at very slow speeds, it is operated in peace and war to perform critical missions—sometimes in marginal weather. The difference between inadvertent and planned entry into IMC is dramatic due to several factors. Inadvertent IMC entry causes problems because it:

- Is unexpected and usually not discussed or planned by the pilots.
- Requires immediate transition to instrument flying from a prior effort to remain visual.
- Usually includes strong pilot anxiety over collision with other aircraft or terrain.
- Often results in roughness or jerkiness on the flight controls by the pilot.
- Is usually entered with the CDR button and CP trigger release depressed, since this is the normal mode while doing difficult maneuvers beneath a low overcast. This condition will probably continue at least into the initial stage of instrument flight.
- Causes poor instrument scan with possible fixation on one gauge or another, sometimes resulting in neglect of the attitude gyro.
- Can contribute to poor cockpit coordination.

The CH-46 is very sensitive to pitch change and usually requires only a few degrees change on instruments to perform most maneuvers. A common problem with pilots who haven't flown instruments for a while, particularly actual instruments, is that they will depress the CDR button and move the cyclic to make a correction and shift their scan from the attitude gyro to other gauges. Before they know it, they have overcorrected, sometimes ending up chasing the attitude gyro. During any traumatic experience in flying, there is a tendency to momentarily freeze or become fixated on one aspect of the event. Where are the hills? What heading should I fly? Should I descend or climb? All the while you are clenching the controls very tightly and stiffly.

The crew. What about cockpit coordination? Most transport helicopters fly with two trained naval aviators with instrument ratings. However, like fixed-wing transports and unlike two-place fighter and attack aircraft, the two individuals in the cockpit may have had little experience together. Too often the briefing before the flight focuses on who will do what in the event of a stereotyped emergency such as engine failure. Not enough training and cockpit coordination is devoted to the specific responsibilities of each pilot during an emergency or assisting each other under difficult IMC. Also, what about familiarity with switches and controls from either seat? H2Ps are supposed to fly certain flights from the right seat. Some HACs think they are being nice guys if they offer the right seat to H2Ps even on a potentially demanding nontraining mission.

Most accidents result from a combination of factors all occurring at the worst time. We can minimize the possibility of helicopter accidents as a result of pilot vertigo following inadvertent entry into IMC if we emphasize the following: (1) *Be mentally prepared* for the possibility of going inadvertently into IMC; (2) *Discuss it* in the brief prior to flying. During the mission the HAC and H2P should be talking to each other. If the pilot flying feels uncomfortable, or if he feels he may not be able to maintain visual flight, he should say so to prepare the other pilot. Constantly be mentally reviewing your course of action if you should go into IMC. Develop the habit of not continually depressing the CDR button or CP trigger release. Let the aircraft do most of the work for you on instruments. Usually, it will do a better job, and it will help you relax and scan more effectively, minimizing fixation.

Take every opportunity to practice simulated and actual instruments. Most helicopter cockpits resemble a greenhouse, and it's hard to truly simulate instrument flying. So utilize a helmet shade to assist. Where trainers are available, make use of them and include unusual attitudes, instrument takeoffs, and autorotations on instruments. Be especially careful flying instruments in a helicopter with a pronounced beat or oscillation. Know your own limitations, and don't press a mission beyond what you feel you are capable of handling, particularly with your *current* proficiency.

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

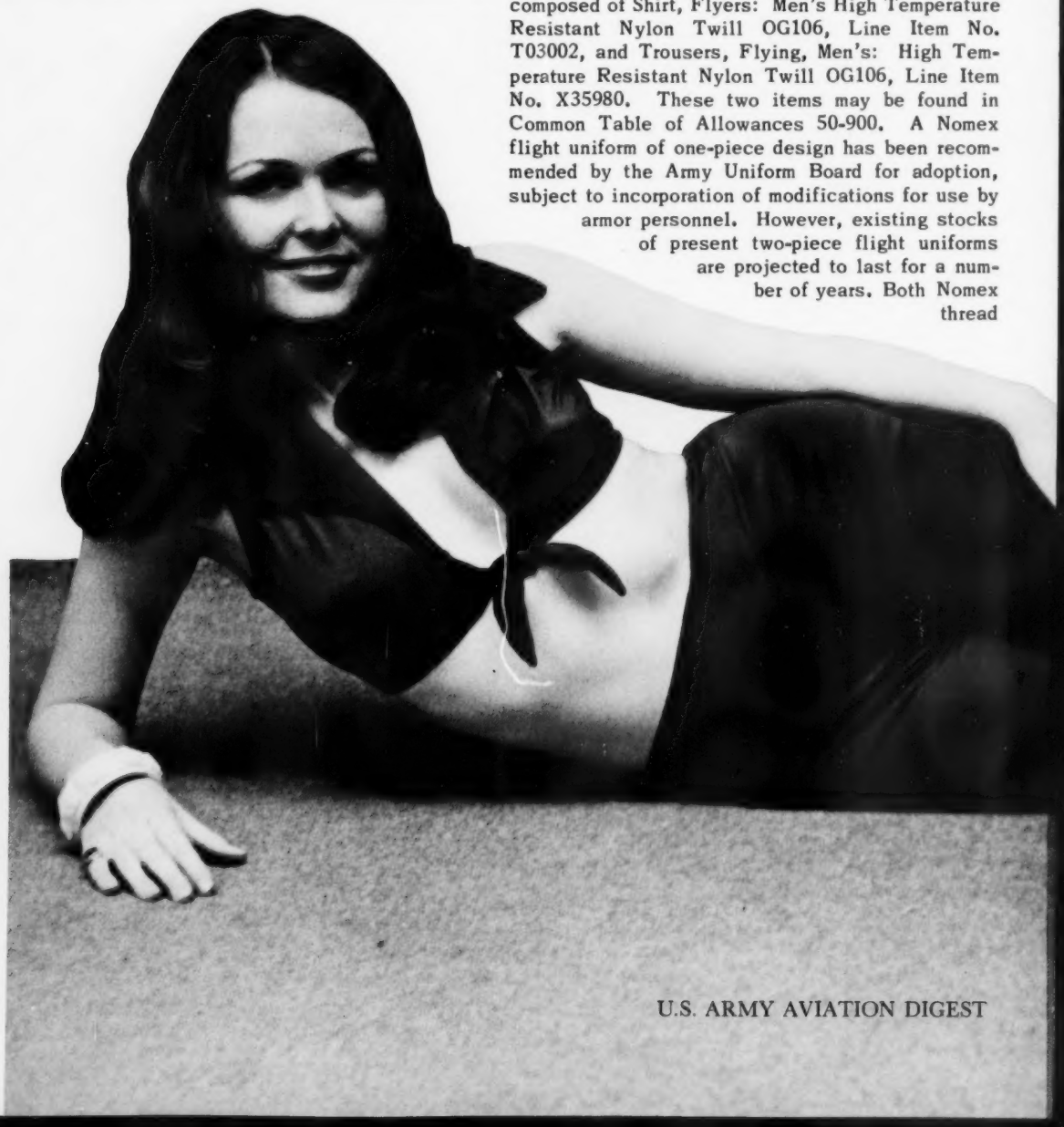
If you have a question about personal equipment or rescue/survival gear, write Pearl, USAAAVS, Ft. Rucker, AL 36362

Flight Uniform

This month four students returned to Santiago, Chile, from the Rotary Wing Course at Fort Rucker. They tell me that the U. S. Army has gone back to the one-piece flight suit (Nomex). I believe this idea comes from the fact that they were issued one-piece flight suits during their training.

I would like to know what the current standard flight suit is: two-piece or one-piece. Also, I need the manufacturer's name and address for Nomex cloth and thread and I'd like to know whether or not the current standard flight suit uses any zippers or only velcro closures.

The only authorized Army flight uniform is composed of Shirt, Flyers: Men's High Temperature Resistant Nylon Twill OG106, Line Item No. T03002, and Trousers, Flying, Men's: High Temperature Resistant Nylon Twill OG106, Line Item No. X35980. These two items may be found in Common Table of Allowances 50-900. A Nomex flight uniform of one-piece design has been recommended by the Army Uniform Board for adoption, subject to incorporation of modifications for use by armor personnel. However, existing stocks of present two-piece flight uniforms are projected to last for a number of years. Both Nomex thread



and Nomex cloth are available through normal supply channels. Chapter 7, TM 10-8400-201-23, covers the maintenance of the Army aviation crewmember's summer uniform. You will note that substitute repair materials are not authorized to be used. Page 7-6 has a complete listing of repair materials. The current standard flight uniform uses a number of both zippers and velcro fasteners.

Nomex is manufactured by the Du Pont Company. You may contact this company by addressing Dr. Fred J. Miller Jr., military coordinator, Textile Fibers Department, E. I. Du Pont De Nemours & Co. (Inc.), Wilmington, DE 19898, telephone (302) 999-3958.

Flyer's Gloves

During the past winter, I felt that the standard Gloves, Flyer's, Summer, NSN 8415-00-139-5409, were inadequate in the Korean environment. Crewmembers often used it inside the standard leather glove shells as a liner for extra warmth. But this practice is probably inappropriate.

The name Gloves, Flyer's, Summer seems to imply that there also exists appropriate winter equipment. Would you enlighten us on this matter?

The Gloves, Flyer's: Nylon Fire Retardant Type GS/FRP-2, are the only *fire retardant* flight gloves authorized for use by Army aircrewmembers. The present handwear authorized for cold weather aircrew personnel wear is Gloves, Shells, Flyer's: Sheepskin Dark Brown, LIN J67927. Six sizes of this all-leather glove are available and intended for wear over Glove Inserts: Wool and Nylon Knit Olive Green 208, LIN J62858. Glove Inserts, Flyer's: Rayon Brown, LIN J62584, are also available and are intended for use by flying and ground personnel as an inner glove when worn with the outer glove shell. These inserts are intended for use where a high degree of dexterity is required and to prevent contact with cold objects when the outer gloves are removed. All the above items may be found in Section II, CTA 50-900, except LIN J62584 which may be found in Appendix A, CTA 50-970.

At present, the U.S. Army Combat Developments Activity (Alaska), APO Seattle 98749, is considering a Letter Requirement for Gloves, Flying, Extreme Cold Weather. You may wish to contact the project officer, CPT Phil Webb, AUTOVON 863-1201/7194, to discuss requirements peculiar to your area of operations.

Life Support Equipment

I would like to know if you have a catalog on the equipment that is displayed in the AVIATION DIGEST.

The Army has no single source document or catalog which describes only aviation life support equipment. Common Table of Allowances 50-900 lists clothing and individual equipment for Army personnel. DA Pamphlet 385-3 describes protective clothing and equipment which is available through normal supply channels. CTA 50-970 lists expendable items which may be procured by your organization. All of the above publications should be available in your unit or at your next higher headquarters.

AR 310-2 will give you information regarding the requisition of Army publications. If you have further questions regarding publications on a specific item of equipment, the DA Pamphlet 310- series should be consulted. This series publication is a consolidated listing of Army publications.

ATC action line

UNITED STATES ARMY AIR TRAFFIC CONTROL ACTIVITY

WHAT HAPPENED TO the USAASO Sez column?

This is it—in a brand new format that will continue to be your source of brief pertinent items on aeronautical services which support your flight mission. The new title is more closely related to the broad scope and objectives of the U.S. Army Air Traffic Control Activity. As the title indicates, we will attempt in future columns to report action items of interest to all aviation elements. Many articles that have appeared in this column were based on inquiries, comments and constructive criticism from field aviation units. Like any progressive viable support agent, USAATCA relies on direct contact with the aviation community for improving the caliber of its facilities and services. As we said—only the name has changed—we will continue to alert you of significant items relating to the broad spectrum of aeronautical services including FLIP; aeronautical charts; new or revised rules and regulations; pilot procedures; and other related operational matters. The new question and answer format is designed to solicit your questions, ideas and—you bet—constructive criticism. And it is just as easy as ever. Write us an informal letter or even simpler—comment card—directed to the address listed below. Yep! It's still a familiar one—***Sez*** precisely what we are and will continue to do—*provide aeronautical services*—even if we say so!

Why is helicopter IFR approach speed restricted to 90 knots in COPTER ONLY procedures?

Descent slopes permitted by the criteria are predicated on a rate of descent not to exceed 90 knots. A buffer for tail wind, which may exist, is considered. Speeds of more than 90 knots may result in excessive descent rates.

Why were the certified VOR ground checkpoints removed from DOD FLIP and where is the data now found?

The data was removed from FLIP because it is readily available to the user. This resulted in FLIP space and cost savings. Ground checkpoints location data is functionally available to the pilot on the airport/heliport where used. Location information for military bases and most civilian fields is normally posted in the operations office/planning room. Signs containing the data are appropriately placed near the checkpoint for pilots' use. Ground checkpoints for civil airports and selected military locations may be found in AIM, Part 4, Graphic Notices and Supplemental Data. The AIM and all its parts are provided to Army aviation activities by this office as a supplement to DOD FLIP for flight planning.

Send questions to:

Director
USAATCA Aeronautical Services Office
Cameron Station, Alexandria, VA 22314

Refer to Glossary on page 23

AN ARMY AVIATOR'S PRAYER

Chaplain (Major) John C. Bailey

11th Aviation Group Chaplain
USAREUR

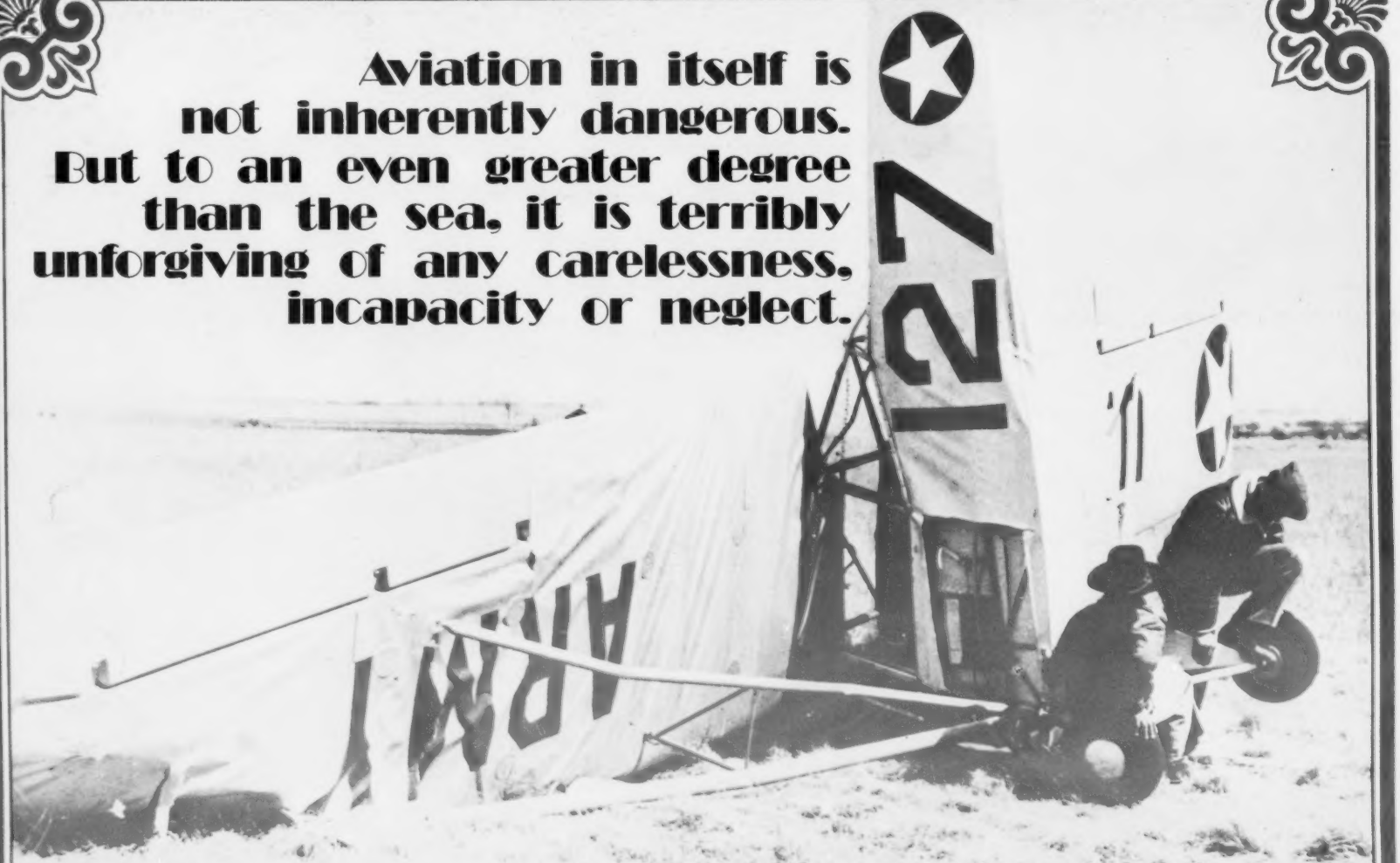
ALMIGHTY AND ETERNAL GOD, hear the prayer of one who shares with all Aviators a deep appreciation of the beauty of Your creations.

I am struck with awe at the vastness of the sky, the majesty of the Earth and the mystery of the seas. I can see clearly the power of nature as I fly through a small part of the universe. I give You my thanks for the ability to fly. I give thanks for the country I serve with pride; for America represents the freedom we were created to enjoy.

Give me the strength of mind and body I need to fulfill the trust placed in me by my fellow countrymen. I have no desire to fight against others, but if freedom is threatened give me courage to do my part as a true professional Soldier dedicated to the restoration of peace. Make me ever mindful of the responsibility I have to those who entrust their lives in my care; for I can never afford the luxury of carefreeness.

When my flight is complete and I am on the solid Earth again, I will lift my eyes to Your heavens and say "Thank you, God, for another safe journey."

Aviation in itself is not inherently dangerous. But to an even greater degree than the sea, it is terribly unforgiving of any carelessness, incapacity or neglect.



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